

AUTOMOTIVE INDUSTRIES

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Cast Crankshaft, Dual Carburetion Feature

The 1934 Ford V-Eight

Improvements increase speed
and reduce fuel and oil con-
sumption—Refinements im-
prove comfort and appearance
—Prices \$5 to \$35 higher

IMPORTANT changes in engineer-
ing details and refinements in
comfort and appearance features
are revealed in the new Ford V-8
which was introduced this week
without any abnormal interruption
in production.

The principal changes in the
powerplant are in the carburetion
and manifolding system and in the
engine crankshaft. In a two-plane,
four-throw crankshaft as employed
in the V-8, it is necessary for two
cylinders in the same bank to fire in
direct succession, at an interval of
90 deg. of crank rotation. There-
fore, with a single inlet manifold,
for a period of about 135 deg. two
cylinders will be drawing in charge
through the same section of the
manifold, while at other times only
a single cylinder is supplied
through this section. This makes
the distribution problem for an en-
gine of this type with a single
manifold exceedingly difficult.

To obviate this difficulty, the
Ford company is equipping the new
model with dual manifold and dual
downdraft Stromberg carburetor.
Each section of the manifold feeds
two cylinders in each bank, the two
inner cylinders of one and the two
outer cylinders of the other. The
manifold is combined with the

valve-chamber cover, as in the pre-
vious model.

One result of the adoption of the
new carburetion and distribution
system is said to be an increase in
the fuel mileage, particularly at
higher engine speeds, due to more
nearly uniform mixture distribu-
tion. Cold-starting characteristics

This de Luxe Tu-
dor is one of
eleven body
types. Colored
fenders are stand-
ard on all de
Luxe bodies



of the engine also are perceptibly improved. The maximum horsepower of the engine is increased approximately 12 per cent, and the fuel mileage by two to three miles per gallon, test runs having shown a mileage of more than 20 at speeds up to 45 m.p.h.

A limited number of cars will be supplied with a self-feeding carburetor used in conjunction with the present type of single manifold. This installation will be supplied where particular importance is attached to simplicity in the carburetion system. With this carburetor no fuel pump is required. In connection with the dual carburetion system, use is made of a new AC fuel pump of the lever-arm type, similar to the one used on the four-cylinder Model B engines.

After having been discussed in engineering circles as a possibility for more than a year, the cast crankshaft has become an element of current automotive practice. The metal of which the crankshafts are made is described as high-carbon cast alloy steel with high-copper chrome-silicon content. It is further stated that the metal has a strong, tough matrix through which hard, wear-resisting particles and finely-divided graphite are distributed. The minimum elastic limit in torsion is said to be equal to that of the forged steel formerly used in the crankshafts.

The new material is said to have a much longer life under alternating stresses like those occurring in an engine crankshaft, and its bearing properties also are said to be better than those of ordinary crankshaft steel. Owing to the hardness

of the surface and the self-lubricating properties due to the graphite content, wear on the journals is said to be greatly reduced. Tests have shown that whereas with forged steel crankshafts there is measurable wear after about 10,000 miles of car operation, with the new cast crankshaft the wear is less than one-ten-thousandths of an inch. There is said to be also less wear of the bearings themselves.

Owing to the fact that the crankpins are cored, which reduces their weight and that of the counterweights required, the new crankshaft weighs approximately 10 lb. less than the forged steel shaft. For truck engines, which operate under more severe conditions, the floating connecting rod bearings are made of copper-lead bearing material with steel reinforcement.

The oil consumption of the engine has been reduced by the provision of new piston rings, modification in the piston design, the installation of baffle plates over the oil-return holes in the valve chamber, and a redesign of the oil-pan tray which permits the oil to return to the sump at a more rapid rate. The piston changes also have added to the strength of the piston head. The number of oil drain holes has been reduced from 12 to 8. The contact area between piston skirt and cylinder wall is now

greater at all operating temperatures. It is recommended to change the oil supply in the crankcase every 1000 miles, and under ordinary driving conditions it is said to be not necessary to add new oil between changes. The oil gage rod is now provided with a pilot tube, to facilitate its insertion.

An interesting change has been made in the valve assembly, whereby it is rendered possible to insert the whole assembly, consisting of the valve, valve spring, spring retainer and valve guide, as a unit through the valve port. To this end the valve guide is split longitudinally. The assembly is held in place by a yoke clip which fits into a groove in the guide and which is put in place through the valve chamber opening. It is estimated that from one to two hours' time is saved by the use of the unit assembly when removing and replacing the valves. The new arrangement is said also to facilitate correct adjustment of valve clearance.

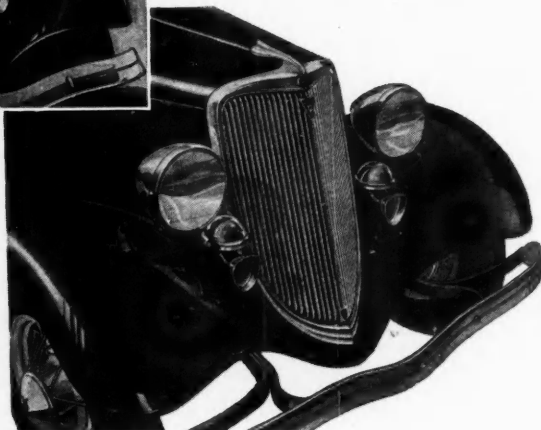
Exhaust-valve-seat inserts of high chrome-nickel alloy are continued, and are said to more than double the period between valve grindings. Furthermore, if advantage is taken of the Ford engine-replacement plan, no valve regrinding is required. Thermostats are now installed in the cooling water lines.



For comparison a view of the preceding V-8 front is shown above



The de Luxe three-window coupe



A front view of the new radiator shell and grille



Additional views of
the new Ford mod-
els appear on page
707

The convertible cabrio-
let of the 1934 Ford
V-Eight line

Suspension on transverse springs is continued, but the rear spring has been made more flexible, which in conjunction with softer cushion springs for the rear seat makes for increased comfort and greater head room. The tips of the leaves in both springs have been modified to reduce the tendency to squeak. Spring shackles remain of the type used at present, which require no lubrication.

A change has been made in the steering-gear ratio from 13 to 1 to 15 to 1. The bearings in the steering gear are of the self-adjusting type.

Newly developed Houdaille double-acting hydraulic shock absorbers are used, and are said to contain no small parts. The design of these shock absorbers is based on the principle that flow of a fluid through an orifice in a thin disk is independent of the viscosity of the fluid. Perforated disks replace the valves formerly provided, making the shock absorbers independent of temperature changes.

Changes in the appearance of the car include new hood, radiator and grille lines, a new instrument panel, and new upholstery treatment. The radiator shell has been increased in depth, its forward edge being rounded to a larger radius than in the previous model. The curve in the grille has been eliminated and the number of openings decreased. The grille members are chromium plated, the chromium having a dull finish, except at the edges, which have a bright finish. The form of the top of the shell and the ornament surrounding the radiator cap are also new. Radiator shell, ornament, and cap are chromium-plated. The hood, which is carried back almost to the front edge of the doors, has two hood latches on each side. Side louvers in the hood are made straight, to match the line of

Prices on 1934 Ford Line

V-8 Passenger Cars

| | New Price | Former Price | Increase |
|----------------------------|-----------|--------------|----------|
| De luxe roadster... | \$525 | \$510 | \$15 |
| De luxe phaeton.. | 550 | 545 | 5 |
| Tudor sedan | 535 | 500 | 35 |
| De luxe tudor sedan | 575 | 550 | 25 |
| Fordor sedan | 585 | 560 | 15 |
| De luxe fordor sedan | 625 | 610 | 15 |
| Five-window coupe | 515 | 490 | 25 |
| De luxe five-window coupe | 555 | 540 | 15 |
| De luxe three-window coupe | 555 | 540 | 15 |
| Cabriolet | 590 | 585 | 5 |
| Victoria | 610 | 595 | 15 |

Commercial Cars and Trucks

| | Four-Cyl. | Eight-Cyl. |
|-------------------------|-----------|------------|
| Chassis | \$335 | \$360 |
| Pickup closed cab..... | 445 | 470 |
| Panel delivery standard | 525 | 550 |
| Panel delivery De luxe | 540 | 565 |
| Sedan delivery | 540 | 565 |
| Station wagon | 635 | 660 |
| Truck, 131 in. | 470 | 500 |
| Truck, 157 in. | 490 | 520 |

Commercial car and truck prices have been reduced \$20 to \$30.

the grille. Hub caps and the spare-tire-lock cover are also of new design, as is the V-8 insignie on the grille.

Another improvement in the V-8 is a new "clear-vision" ventilating system which is similar to that in the new Lincoln cars. The glass in the front door and rear windows (where used) can be slid back a maximum distance of more than 1 in. in the front doors, and a maxi-

mum of 2 in. in the rear windows. The vertical opening between the frame and the glass serves for the exhaustion of air from the body. For cold-weather driving, in addition to any air filtering in by normal leakage, air in small quantities enters through holes in the bottom edge of the doors, passes up through the shell of the doors, and enters the interior of the bodies along the

(Turn to page 719, please)

Rear compartment
of the de Luxe Tudor
sedan showing the
rear side window
ventilating slot



Ten Month Total Assures Billion Dollar Domestic Retail Sales Volume in 1933

U. S. New Car Registrations and Estimated Dollar Volume by Manufacturing Groups—Ten Months 1933 and 1932

| | Percentage of Total Units | | Percentage of Total Estimated Dollar Volume | |
|------------------------|---------------------------|-------|---|-------|
| | 1933 | 1932 | 1933 | 1932 |
| Chrysler Corp. | 25.3 | 16.8 | 23.7 | 16.8 |
| Ford and Lincoln | 20.4 | 23.4 | 17.9 | 18.3 |
| General Motors | 44.6 | 42.6 | 46.2 | 41.6 |
| Total | 90.3 | 82.8 | 87.8 | 76.7 |
| All Others | 9.7 | 17.2 | 12.2 | 23.3 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

U. S. Registrations of New Passenger Cars and Estimated Dollar Volume by Retail Price Classes—Ten Months of 1933 and 1932

| | Units | | Per Cent of Total | | Per Cent Change | | Estimated Dollar Volume | | Per Cent of Total | | Per Cent Change |
|------------------------------------|-----------|-----------|-------------------|-------|-----------------|----------------------------------|-------------------------|---------------|-------------------|-------|-----------------|
| | 1933 | 1932 | 1933 | 1932 | | | 1933 | 1932 | 1933 | 1932 | |
| Chevrolet, Ford and Plymouth | 929,373 | 633,487 | 69.3 | 63.1 | +46.8 | Chevrolet, Ford and Plymouth ... | \$511,000,000 | \$373,000,000 | 58.2 | 48.2 | +37.0 |
| Others under \$750 | 224,901 | 76,143 | 16.8 | 7.6 | +195.0 | Others under \$750 | 147,000,000 | 52,000,000 | 16.8 | 6.7 | +193.0 |
| \$750-\$1,000 | 102,989 | 173,539 | 7.7 | 17.3 | -40.7 | \$750-\$1,000 | 86,000,000 | 151,000,000 | 9.8 | 19.5 | -43.1 |
| \$1,000-\$1,500 | 53,493 | 71,263 | 4.0 | 7.1 | -25.0 | \$1,000-\$1,500 | 63,000,000 | 86,000,000 | 7.2 | 11.1 | -26.8 |
| \$1,500-\$2,000 | 11,236 | 24,492 | .8 | 2.5 | -54.2 | \$1,500-\$2,000 | 19,000,000 | 41,000,000 | 2.2 | 5.3 | -53.6 |
| \$2,000-\$3,000 | 13,146 | 17,338 | 1.0 | 1.7 | -24.1 | \$2,000-\$3,000 | 32,000,000 | 44,000,000 | 3.6 | 5.7 | -27.3 |
| \$3,000 and over | 4,804 | 7,304 | 0.4 | 0.7 | -34.2 | \$3,000 and over | 19,000,000 | 27,000,000 | 2.2 | 3.5 | -29.6 |
| Total | 1,339,942 | 1,003,556 | 100.0 | 100.0 | +31.5 | Total | \$877,000,000 | \$774,000,000 | 100.0 | 100.0 | +13.3 |
| Miscellaneous | 1,048 | 2,802 | | | | | | | | | |
| Total | 1,340,990 | 1,006,358 | | | | | | | | | |

U. S. Registrations of New Passenger Cars and Estimated Dollar Volume by Retail Price Classes—October, 1933 and 1932

| | Units | | Per Cent of Total | | Per Cent Change | | Estimated Dollar Volume | | Per Cent of Total | | Per Cent Change |
|------------------------------------|---------|--------|-------------------|-------|-----------------|----------------------------------|-------------------------|--------------|-------------------|-------|-----------------|
| | 1933 | 1932 | 1933 | 1932 | | | 1933 | 1932 | 1933 | 1932 | |
| Chevrolet, Ford and Plymouth | 98,556 | 40,687 | 72.3 | 65.0 | +142.0 | Chevrolet, Ford and Plymouth ... | \$55,000,000 | \$24,000,000 | 62.5 | 51.0 | +119.0 |
| Others under \$750 | 22,315 | 7,288 | 16.4 | 11.6 | +206.0 | Others under \$750 | 15,000,000 | 5,000,000 | 17.1 | 10.6 | +200.0 |
| \$750-\$1,000 | 9,489 | 8,098 | 7.0 | 12.8 | +17.3 | \$750-\$1,000 | 7,000,000 | 7,000,000 | 8.0 | 14.9 | none |
| \$1,000-\$1,500 | 3,360 | 3,459 | 2.5 | 5.5 | -2.8 | \$1,000-\$1,500 | 4,000,000 | 4,000,000 | 4.5 | 8.5 | none |
| \$1,500-\$2,000 | 571 | 1,251 | 0.4 | 2.0 | -54.4 | \$1,500-\$2,000 | 1,000,000 | 2,000,000 | 1.1 | 4.3 | -50.0 |
| \$2,000-\$3,000 | 1,538 | 1,309 | 1.1 | 2.1 | +17.5 | \$2,000-\$3,000 | 4,000,000 | 3,000,000 | 4.5 | 6.4 | +33.3 |
| \$3,000 and over | 398 | 602 | 0.3 | 1.0 | -34.0 | \$3,000 and over | 2,000,000 | 2,000,000 | 2.3 | 4.3 | none |
| Total | 136,227 | 62,694 | 100.0 | 100.0 | +117.0 | Total | \$88,000,000 | \$47,000,000 | 100.0 | 100.0 | +87.0 |
| Miscellaneous | 99 | 501 | | | | | | | | | |
| Total | 136,326 | 63,195 | | | | | | | | | |

New Passenger Car Sales Surpass 1932 in 46 States at the End of October

With only two states behind 1932 at the end of October, and these by small percentages, it is now quite possible that by the end of the year every state will show an increase over last year.



□ 30% and More Ahead of 1932
 ▨ 15%-30% Ahead of 1932
 ▩ 0-15% Ahead of 1932
 ■ Behind 1932



New Passenger Car Registrations 10 Months 1933 and 1932 Compared

| | Per Cent Increase 1933 Over 1932* |
|---------------|--------------------------------------|
| Alabama | 71.8 |
| Arizona | 42.8 |
| Arkansas | 56.7 |
| California | 36.0 |
| Colorado | 11.8 |
| Connecticut | 37.0 |
| Delaware | 29.0 |
| Dist. of Col. | 8.7 |
| Florida | 29.9 |
| Georgia | 68.3 |
| Idaho | 49.5 |
| Illinois | 32.5 |
| Indiana | 30.4 |
| Iowa | 34.2 |
| Kansas | 61.0 |
| Kentucky | 46.0 |
| Louisiana | 43.6 |
| Maine | 11.5 |

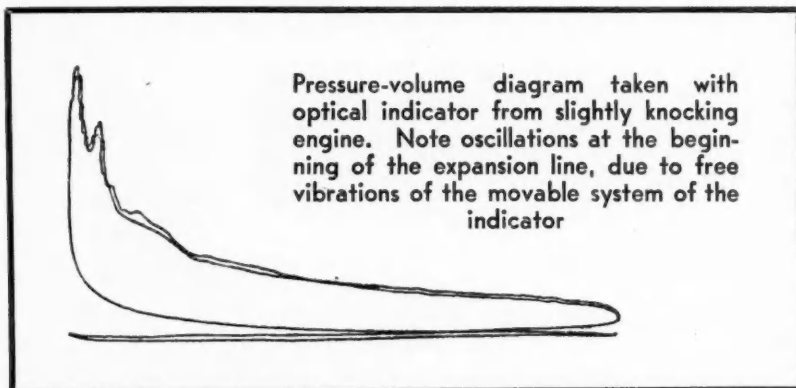
| | Per Cent Increase 1933 Over 1932* |
|---------------|--------------------------------------|
| Maryland | 8.8 |
| Massachusetts | 23.1 |
| Michigan | 43.5 |
| Minnesota | 23.1 |
| Mississippi | 70.0 |
| Missouri | 14.0 |
| Montana | 45.0 |
| Nebraska | 38.1 |
| Nevada | -5.5 |
| New Hampshire | 18.2 |
| New Jersey | 17.0 |
| New Mexico | 59.9 |
| New York | 16.5 |
| N. Carolina | 86.5 |
| N. Dakota | 26.6 |
| Ohio | 55.0 |
| Oklahoma | 63.9 |
| Oregon | 52.0 |

| | Per Cent Increase 1933 Over 1932* |
|---------------|--------------------------------------|
| Pennsylvania | 25.8 |
| Rhode Island | 35.6 |
| S. Carolina | 99.6 |
| S. Dakota | 17.2 |
| Tennessee | 67.4 |
| Texas | 74.2 |
| Utah | 64.0 |
| Vermont | -7.9 |
| Virginia | 4.2 |
| Washington | 45.0 |
| West Virginia | 50.3 |
| Wisconsin | 5.7 |
| Wyoming | 16.7 |
| Total | 33.2 |

* — = decrease.

INDICATOR DESIGN

Shows Steady Progress Toward



by P. M. Heldt

Engineering Editor,
Automotive Industries

IN the development of steam and internal combustion engines the engine indicator has been of great help. Unfortunately, the early indicators were suitable for use only at low speeds, and the adaptation of indicators to high-speed operation has usually lagged behind the corresponding development in engines themselves. It is interesting in this connection that when Watt first built an indicator in 1814, he used it on an engine turning over at the leisurely speed of 10 r.p.m., so that a mercury gage could be used to obtain the pressure record. As the speed of steam engines increased, the piston-and-spring type of indicator was developed, which, with refinements, has remained in use up to the present for indicating engines turning over at up to 500 r.p.m. and even somewhat faster.

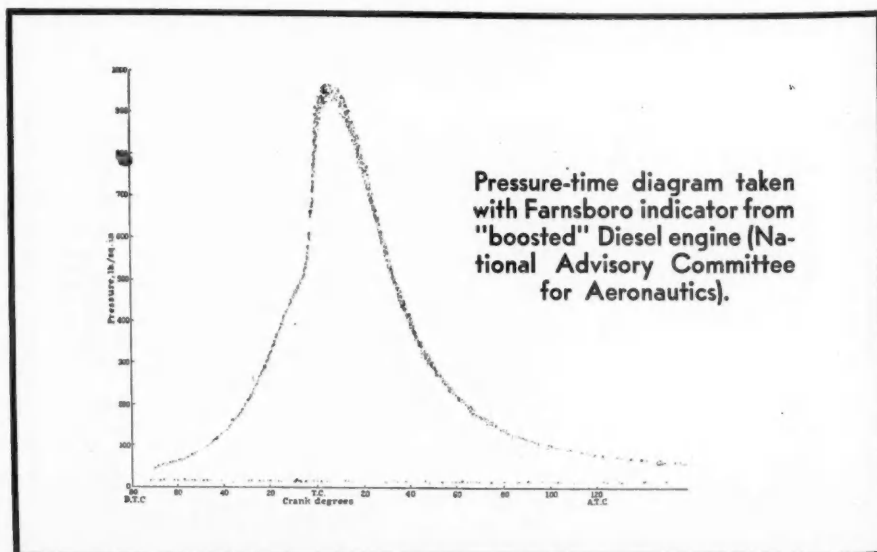
This type of indicator is generally referred to as a mechanical indicator, and its weakness resides in its speed limitation. The moving parts of such an indicator, supported by the gaseous pressure on the one hand and the spring force on the other, form an elastic system with a period of free vibration of its own. When these parts are suddenly set in motion by a change in the gas pressure, the system will vibrate at the rate corresponding to its own period, and a record of these vibrations will be superimposed on the curve of gas pressure traced by the instrument. If the period of free vibration of the movable system is long, the amplitude of the vibration will be great, depending, of course, on the impulse

given to the system by pressure variation, and the pressure diagram will be correspondingly "disfigured."

The influence of free vibrations of the moving system of an indicator is particularly great when an engine is knocking and when there are, therefore, very rapid variations in cylinder pressure. When indicator cards are taken under these conditions with an indicator whose moving system has a relatively high inertia, there appear usually a series of large-amplitude oscillations at the beginning of the expansion line. For a long time it was believed that these oscillations corresponded to rapid pressure oscil-

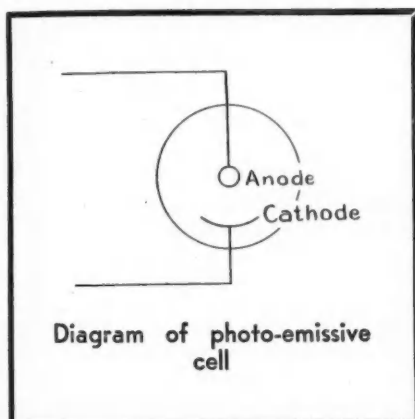
lations in the cylinder when the engine is knocking, but diagrams taken with more recent types of indicator in which mechanical inertia is practically eliminated show that although the pressure in the cylinder rises extremely rapidly and to a much higher value when the engine is knocking than when it is running smoothly, the expansion line is smooth and there is no indication of any successive increases and decreases of cylinder pressure during the first part of the expansion stroke.

Inertia of moving masses cannot be completely eliminated, but it can be reduced to negligibly small value. With decrease in inertia, the frequency of free vibration of the moving system of the indicator increases, and this frequency is generally taken as an index of the suitability of the instrument for use at high speeds. It has been possible recently to develop instruments which have a frequency of free vibration of their moving sys-



Greater Sensitivity and Accuracy

The first of a series of articles describing the latest developments in the engine indicator field



tems of 100,000 per second; these can be used for taking indicator cards at speeds as high as 10,000 r.p.m., and even higher.

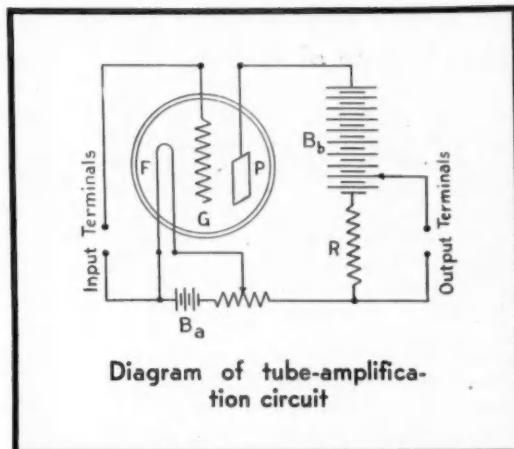
The first attempts to develop indicators better suited to high-speed operation than the conventional mechanical type resulted in the optical indicator. In this instrument a beam of light from a source of high intensity was reflected by a small mirror which was so mounted that it could be deflected around two axes at right angles to each other. Deflection around one of the axes was accomplished by a diaphragm subjected to the gas pressure in the cylinder, and deflection around the other axis by a mechanism connected to the crankshaft of the engine. Some very good "qualitative" results were obtained with instruments of this type, but their accuracy left much to be desired, one particular defect being that the diaphragm chamber had to be connected to the combustion chamber through a tube of considerable length,

Part I

Part 2 will appear in an early issue.

which not only altered the compression ratio in the cylinder being indicated, but caused pressure waves to be generated in the tube, so that the indicator recorded something which did not occur in the combustion chamber itself. Moreover, even with these indicators the natural frequency of free vibration was still far too low for really high-speed operation, especially with an engine at all inclined to knock, and the first part of the expansion line then always consisted of a series of waves. Fig. 1 shows such a diagram, taken with an optical indicator.

Other efforts to overcome this difficulty resulted in the balanced-pressure type of instrument, of which the Farnboro is the best representative. With these instruments, instead of a mass being moved in direct proportion to the cylinder pressure, movement occurs only when the cylinder pressure equals a known counter pressure derived from a bottle of compressed gases. When equalization of pressure takes place, an electrical contact is made and a spark passes through the indicator card to the drum on which it is mounted, burning a hole in the card, the spark terminal having been raised previously by the balancing pressure a distance proportional to that pressure. The Farnboro indicator undoubtedly has many good qualities and has been used extensively also in this country; but that it has its weak points also is indicated by the fact that modifications of the instrument are often made. One investiga-



tor claims that the instrument leaves something to be desired from the standpoint of simplicity and accuracy. He states, moreover, that the diaphragm usually becomes defective after about 20 diagrams have been taken and then must be repaired or replaced. Indicators of this type do not give a continuous diagram representing a single engine cycle, but a diagram made up of a large number of points from successive cycles, each cycle being represented by one point on the ascending and one on the descending slope of the pressure wave. Fig. 2 shows a pressure-time diagram taken with a Farnboro indicator.

Another line of development gave us a number of instruments in which a stroboscopic or sampling valve is used, which places the cylinder of an ordinary mechanical indicator in communication with the engine cylinder to be indicated, for an instant at corresponding points of successive engine cycles. A substantially steady pressure is thus established in the cylinder of the indicator, and the stroboscopic valve, which is driven from the engine crankshaft, is provided with means by which the point of the cycle at which communication between the combustion chamber and the indicator cylinder is established can be gradually varied. Indicators of this type have received particular attention in this country, and three such instruments are now available, the De Juhasz, the Jacklin, and the Prescott. These instruments probably appeal most to the engineer who wishes a practical in-

strument for the testing department, but they are not so popular with scientific workers desiring highly accurate results. One of their shortcomings apparently is that the communication between the combustion chamber and the engine cylinder is not instantaneous, but extends over a small fraction of the cycle, and the pressure recorded must be intermediate between the maximum and the minimum pressures in the cylinder during this portion of the cycle, so that no very high degree of accuracy can be achieved for those portions of the cycle during which the pressure varies rapidly, particularly the first part of the expansion stroke.

Electric Type of Indicator

Another form of indicator is the electric type, in which pressure fluctuations in the cylinder are converted into fluctuations of electric currents and records of these fluctuating currents are produced by means of an oscillograph. An instrument of this type has been developed in the laboratories of the General Motors Research Corporation by E. J. Martin and D. F. Caris. A Wheatstone-bridge circuit is employed, two of the arms of which are constituted by stacks of carbon discs. These carbon-disc piles are mounted on opposite sides of an arm which is under the influence of the gaseous pressure on a diaphragm. When the gas pressure varies, the pressure on one stack of carbon disks increases while that on the other decreases; this throws the Wheatstone bridge out of balance and causes a current to flow through the battery circuit which is directly proportional to the gas pressure. A detailed description of this indicator appeared in *Automotive Industries* for Feb. 15, 1930.

All of the instrument types described in the foregoing had been developed previous to 1930, and those who wished to do research work on engines requiring the use of an indicator seem to have had a considerable variety of instruments to choose from. But research men are fastidious; they are constantly aiming at a higher degree of accuracy, and they want instruments that are not too expensive or too complicated, that are unaffected by engine vibrations, and that can be used up to the highest speeds met with in engine practice. None of the earlier instruments fully meet all of those requirements, and so development work in this field has continued. The fact that the high-speed engine indicator presents a problem that is rather fascinating to the experimental physicist probably also has had its effect in stimulating activity in this field.

New types of indicators have been developed recently in France, Germany, Canada and Japan, and brief descriptions of these instruments will be given in succeeding articles.

The French instrument was developed by M. A. Labarthe, associate professor of theoretical mechanics in

the University of Paris, and was described by him at a recent meeting of the French Society of Automobile Engineers. In the development of the electric portion of the apparatus M. Labarthe had the assistance of M. Demontvignier. M. Labarthe calls his instrument a photo-cathodic indicator, both a photo-electric cell and a cathode-ray oscillograph being included in the apparatus. He claims that it is absolutely free from inertia effects whatever the engine speed, as well as from effects of engine vibration. Either pressure-volume or pressure-time diagrams can be taken at will; the former can be thrown out of phase by 90 deg. or the phase displacement can be varied over the cycle so as to bring out the pressure-volume relations for certain parts of the cycle, such as the high-pressure portion, particularly clearly. Finally, the diagrams may be observed as traced on a ground-glass screen, or still photos or moving pictures may be made of them.

The operation of the Labarthe indicator is based on the principle that when a parallel beam of light rays strikes a convex mirror, the reflected beam diverges more or less according to the convexity of the mirror. The reflected beam is thrown onto the light-sensitive element of a photo-electric cell, which latter then sends out a current whose intensity depends upon the luminous flux falling upon it. As the photo-electric cell is not yet an article of general use, a brief description of this device may be incorporated here.

There are several different types of photo-electric cells. That used in connection with engine indicators is known as a photo-emissive cell. It consists of a glass bulb or tube within which are an anode (electrode connected to the positive terminal of the source of current) in the form of a wire, and a cathode in the form of a plate or metallized surface, which is covered with some light-sensitive material. Anode and cathode are spaced about half an inch apart. The tube may be either evacuated or filled with some gas. A direct-current potential of 20 to 90 volts is applied to the terminals of the tube, through an outside resistance of several megohms.

Owing to the gap between the anode and cathode, no current flows through the tube under normal conditions, but when a beam of light is played on the cathode, a current is set up which is directly proportional to the light flux received by the cathode and is only slightly affected by the electric potential in the circuit as long as that is above 20 volts.

To those familiar with the laws of direct-current electric circuits it may seem puzzling that with such a large outside resistance as several megohms, the current flow should be directly proportional to the light flux, which apparently affects only the resistance of the gap. The explanation is that the current is carried across the gap by

electrons which are detached from the sensitive surface of the cathode by the rays of light striking it. The greater the flux of light striking the cathode, the more rapid the production of electrons, and the larger the current. Voltages up to 400 can be safely applied to vacuum-type photo-electric cells. A diagram of such a cell is shown in Fig. 3.

The currents produced by photo-emissive cells are exceedingly small and inadequate for the direct actuation of relays or other mechanical devices. It is therefore necessary to "amplify" these currents, and this is accomplished by means of amplifying circuits including vacuum tubes, as used for radio amplification.

The principle of the amplifying tube is briefly as follows: Referring to Fig. 4, the tube contains three elements, viz., a filament F serving as cathode, which is brought up to incandescence by current from a low-voltage battery B_a (the "A" battery); a plate P serving as anode, and a grid G interposed between the cathode and anode. A "B" battery B_b of perhaps 180 volts is connected to the cathode and anode of the tube, with a resistance R of upward of 100,000 ohms in circuit. The leads from the photo-electric cell (or other source of current to be amplified) are connected to the filament and the grid, while the output terminals, from which the amplified current is taken, are connected across the resistance R, with a sufficient number of cells of the "B" battery included to compensate for the drop in voltage through the resistance R. Any change in the voltage of the source of supply (the grid voltage) then brings about a proportional change in the voltage across the output terminals. The ratio of the change in output voltage to the change in grid voltage is known as the voltage magnification. This ratio may be as high as 100 and even higher. If a single stage of amplification is not sufficient, two stages may be used.

Ozone Good for Diesels

It has been found that ozone has a detonation-promoting effect of about the same order of magnitude as the detonation-suppressing effect of tetra-ethyl lead. As small a proportion as 0.002 per cent of ozone in the mixture is equivalent to the difference between standard and premium fuel, and if the proportion is raised to 0.01 per cent, ordinary and premium gasoline knock as badly as kerosene under normal conditions. It is hoped that the discovery of this property of ozone may help in throwing light on the exact action of such anti-detonants as tetra-ethyl lead. No doubt ozone would reduce the ignition delay in Diesel engines and thereby reduce knock in such engines.

JUST AMONG OURSELVES

A Rose by Any Other Name—

"SENATOR" FORD is scheduled again to furnish the humorous relief at the National Automobile Chamber of Commerce banquet on Jan. 9. Believed by many banqueteers to be the most sure-fire of the after-dinner humorists in circulation today, the "Senator" has a habit of being good even when his assignments are tough.

This year he should find the going easy. Engineers and advertising departments have united to assist him. The technicians have started equipping cars with independent wheel suspensions and the advertising departments have started giving the construction special names.

Already we know that "knee-action wheels" will be standard on all General Motors cars and that "axleflex" type of suspension will be optional on Hudsons and Terraplanes. There are more to come.

Let'er go, Senator!

* * *

A Name to Show Effect

THE effort to popularize independent wheel suspension by use of some term which will describe its effects to the average car owner is thoroughly sound merchandising, however much it may foster wise-cracking within the confines of the industry itself.

Too often have hundreds of thousands of dollars been spent trying to inform the public about technical names and engi-

neering mysteries which only those willing to concentrate studiously could ever hope to comprehend. The public, by and large, is interested in effects, not causes. It does not concentrate studiously on automobile advertising and never will.

* * *

New Security Act Will Delay —

PERIODS of recovery from depression in the automobile industry have always been characterized by complete elimination of some companies and by an unusual number of mergers, reorganizations and new ventures. Coincidence of these two apparently contradictory trends is not as strange as it might appear at first glance. Panic periods do not permit final winding up of a company's affairs with minimum loss any more than they foster sale of new securities on a favorable basis.

We are now in a period of recovery and an increase in both of these phenomena is to be expected.

The stringent and ambiguous provisions of the new securities act may delay some reorganizations and mergers where issue of new securities is necessary to consummation of plans. Investment bankers are afraid of errors of omission rather than of errors of commission.

Modification or clarification of some provisions of the act in the next Congress would, we believe, result in more than one constructive realignment in financial and management structure in the automotive field. In the mean-

time rumors of new deals and new rumors of old deals continue to fly about.

* * *

Driving His 42nd Buick

THERE are more than 68,000 Buicks in operation that are 10 or more years old, W. F. Hufstader, Buick sales manager, said the other day, reminiscing over an interesting stack of Buickana dug up recently in various parts of the country.

One owner, a South Carolina physician, it appears, is driving his 42nd Buick, all of them bought for his business and professional use. A Texas owner wrote in about a 1909 model which he still is running and which, he claims, averages 22 m.p.g.—which, it occurs to us, is pretty good mileage in any model.

But the most interesting one of Hufstader's collection, it seemed to us, was about the two men who have run their 1912 model only 4000 miles. They took good care of it from the start. When they went to church on Sunday they put it under shelter, and if it was raining when service was over they walked home rather than get it wet. Little wonder that the paint job still looks like new!

* * *

The Center of the Target Is—

TALKING of this and that in his little bulletin "Automotive Comment" recently, H. Bertram Lewis wrote one sentence which gives the basis for judging every wage payment system—particularly methods of paying salesmen: "Does the system put the big rewards against the prime objectives?"—N. G. S.

HAVE EMPLOYER PLANS A PLACE IN

Industrialists who have had experience with them say "Yes" if the problem is approached in the proper spirit

by Joseph Geschelin

Engineering Editor, Automotive Industries

If any employer approaches an employee representation plan simply as a defensive measure against trade unionism, he is foredoomed to failure, in the opinion of many industrialists who have pioneered in this field of industrial relations.

If an employer seeks to set up an employee representation plan simply as a stop-gap or subterfuge, ignoring the need of machinery for collective bargaining, he is just letting himself in for a lot of trouble.

But if the employer approaches this problem of the hour with obvious sincerity of purpose, with an evident desire to cooperate with his workers and to provide a means of mutual cooperation, industrialists experienced in this field believe that he is taking a step toward better industrial relations and better understanding.

Intelligent leadership, the kind that will anticipate the labor situation, is urgently needed. Shall we leave the industrial education of workers to labor unions, or will we take the bull by the horns and deal with employees through capable, diplomatic personnel men who know what it's all about?

Perhaps in time the action of individual employers may be strengthened by group action through an agency such as the NACC, which might formulate a plan flexible enough for wide general application, yet one which would permit a more or less uniform handling of a common problem.

Because of the temper of the times it is rather unfortunate that the Administration permitted, in the language of Article 7 (a) of the NIRA, the use of the term "company union," which implies an organized effort on the part of employers to bind their workers to membership in a strictly company affair. Therefore, it has been sug-

gested by some people that the employer, in formulating a plan, should stress the following points:

1. That the plan is the free choice of the majority of employees on the payroll.

2. That employees have had an opportunity not only to discuss the plan, but to offer suggestions as to changes.

3. That nominees for employee representatives have been freely selected by the employees and that the representatives have been finally chosen in a free election.

4. That legally and practically the plan provides some definite machinery for collective bargaining.

5. That the plan is not a "company union," but simply a stated method whereby the mutual problems of the company and employees can be aired and adjusted.

6. That it is free of coercion or influence and that membership is neither compulsory nor automatic.

Employee representation plans are not a new idea in industrial relations. Plans of various kinds have been in use for at least fifteen years in a number of industries, notably the oil industry, rubber goods manufacturers, at International Harvester, and elsewhere. But such plans are relatively new in the automotive industry and for this reason they are being attacked

by organized labor on the ground that they are devices to combat freedom of action on the part of the workers.

The answer, provided the plan is obviously above board and free of suspicion, is that the plan not only is a legal and desirable action on the part of the employer, but furthermore that it indicates a spirit of cooperation on his part and an evident desire to anticipate requests for collective bargaining.

In one respect, Article 7 (a) may change the complexion of existing plans, since it is obvious that to comply with the demand for collective bargaining the plan should include not only the machinery to that end, but also some provision for arbitration. How this may be done is a matter of great moment and the subject of much controversy.

It is worthy of comment at this point that evidently the Administration has for the first time recognized the employee representation plan as a definite instrument in industrial relations in its action of appointing as a labor member of the Petroleum Labor Policy Commission an employee representative of the Standard Oil Co. of N. J.

Now the practical desirability of an employee representation plan and the only reason for its ultimate

REPRESENTATION IN THE NEW DEAL?

continued existence, according to many industrial leaders, is the means it offers of maintaining a friendly and cooperative relationship between the employer and his workers. With proper design the plan can serve as a double-edged tool of great value to the employer. It can serve to bring about a free discussion of the employees' problems on the one hand, and, by the same token, can enable the employer to bring to the attention of employees the problems of the management. By this means the management can get before the workers figures concerning the business of the company, anticipated changes in production, design changes, equipment changes, and the like.

It has been said that the strength of the plan lies in the inherent weakness of unionism. Where the union promotes class distinction and jurisdictional disputes within its own ranks, the plan encourages solidarity and group action. It is traditional in the automotive industry that a man prides himself on the fact that he is a Packard or a Hudson or a Cadillac man rather than a carpenter or a welder or a toolmaker. That's why unions have failed before; that's why the plan may be a powerful factor in the situation now if properly handled.

Another advantage of the plan, according to present experience, lies in its ability to cover the manifold relations between the employer and employee. Whereas the union is concerned only with wages and hours of employment, the plan can handle not only these matters, but others of perhaps equal importance—working conditions, health and sanitation, general welfare, recreation, and the like.

As a matter of record, this point is emphasized by the fact that in several cases where unions have become established, the plan is operated concurrently, the union handling hours and wages, while the plan takes care of the company's in-

terests with the employees and provides the machinery for handling the other relations.

In gaging the present situation it is desirable to have a good picture of the present labor movement in the United States. We formed a very good one from a talk given by an intelligent and rather impartial student of the subject several days ago.

He made it clear by an analysis of statistics that the American Federation of Labor has reached its wartime strength, although the Federation makes bolder claims. But the important fact is that this renewed vigor has come from the normal extension of activity in established union trades rather than from any significant unionization of new trades or crafts.

As usual, the strength of the A. F. of L. is sapped by jurisdictional disputes. The new charters which have been granted in recent months to organizations in Detroit, Philadelphia, and elsewhere, are to Federal locals which are nominally unattached and must stand by themselves. The question now is—can these Federal locals survive, particularly when they are divided by crafts classifications?

Inflation of currency is clothed with particular significance in this connection by our informant. He feels that if inflation continues and if it produces a marked rise in commodity prices out of step with wages that union activity will become intensified, since that will be a weapon for forcing wage increases.

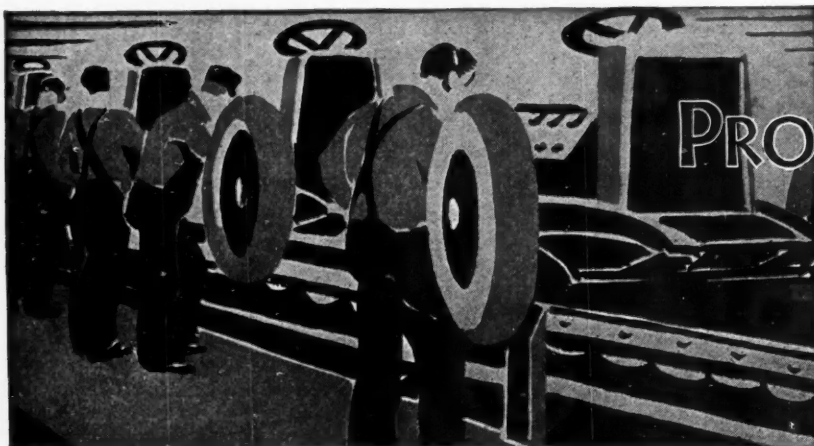
Everything being considered, there is an unquestioned need now for intelligent leadership on the part of industry. There is need for acting ahead of a situation that may be in the making.

That may be the answer to the question—Shall we attempt to start an employee representation plan at this late hour? In the opinion of many who have had experience in



the field, the answer seems to be "Yes!" Even though a union has started its propaganda and has made headway, the plan seems to be good business. It prevents the union from assuming complete control of the employees; it enables the employer to maintain contact with loyal employees who may find that the union is not what they thought it was and that the company can do more for them.

Anyway, it's well worth thinking about.



Electric Melting

Metallurgists and engineers will be very much interested in the facts disclosed in a treatise on electric melting with the Detroit Rocking Electric Furnace. Applied first to the production of specification brass and bronze, it has extended its influence to cast iron, malleable iron, and stainless steels. It provides a means of obtaining electric furnace iron of high tensile strength coupled with good machining properties. Irons possessing a modulus of elasticity in excess of 30,000,000 are now obtainable as well as elongation values from 3 to 10 per cent. The furnace provides complete control of temperatures up to 3200 deg. F.

Fashion Code

For the Fall and Winter grey has surpassed maroon in importance according to the *Automobile Color Index* (Duco Color Advisory Service) although black continues to lead by a wide margin. This is also the finding of the current *Autocolor* (Mimax and Ditzlac). Incidentally, the latter gives color cards for a number of new hues for the coming season, Stonebeige, Cruise Blue, and Tokay Red being titles indicative of the new idea.

Flash Out

Durez Molder for November notes the superiority of semi-positive dies over flash dies in plastic molding. Say they in conclusion:

"For these above reasons, and because semipositive dies may be run with less supervision from the shop foreman (in other words, are more nearly fool proof) the trend in present day die construction is toward semipositive dies, even though the initial cost is slightly

higher. It is apparent that in the future, flash type dies will only be used on small, short-run jobs."

What! 800,000

We are advised by one who knows that over 800,000 automobile radio sets have been installed in 1933. According to the Hygrade Sylvania Corp. (tubes and lamps of all kinds), this is a measure of the public's reaction to the refinements incorporated in auto radio recently. The biggest improvement came with the development of a self-contained source of B-power supply. But a lot of credit goes to people like Hygrade who have made available the modern radio tubes especially suited to automobile service.

Vibratuned

Hygrade Sylvania has the answer in the newly-designed Vibratuned lamp bulb. The trick lies in a flexible shock absorber filament which vibrates with the high frequency vibration present in most mill and factory installations. By the use of this lamp, now available in large sizes, upkeep of the lighting installation can be cut to the minimum. Certainly worth investigating.

Wheel Recommendations

Entire issue of *Grits and Grinds* for September-October, 1933, is devoted to the correct manner of grinding small tools of every description. It shows how to do the job and tells what of type and grade of wheel is best suited. One of the best features of the book is the table giving grinding wheel specifications for each type of cutting tool—and they certainly have covered a big variety. Here's a treat

tise that's well worth routing through the tool cribs and grinder departments.

For Merit

In recognition of outstanding merit, the Franklin Institute has commissioned the Federal Products Corp., to build a dial indicator for the permanent exhibit at the Institute. The indicator is the biggest ever. It's thirteen inches in diameter, big enough for the general public to get the idea.

Welcome

Many hearts are being gladdened by the (confidential) news that a number of generator makers are ready to bring about a major improvement in the electrical systems of automobiles. First we will have greater capacity either through the use of larger generators or the same size equipped with a cooling fan. Several forms of voltage regulators will be available to control output when the extra juice isn't needed. Maybe this won't be a boon to the harassed battery producers and the generator people who have sweated over machines that continue to "throw solder" when the third brush is moved up, into high.

Aircraft News

The wings of Boeing pursuits and fighters have a safety factor of over twelve. The wing of the new high-speed Boeing transport of United Air Lines will stand up under a load of thirty-six and a half tons and its landing gear under a load of thirty-two and a quarter tons, although the plane itself has a gross weight of just six and a half tons!—J. G.

MANUFACTURING
MANAGEMENT
METALLURGY

Precision Finishing of Blind-End Bores

By Joseph A. Carlin*

Accuracy in cylinder honing a factor of increasing importance. Close tolerances and smooth finish the essential combination

ACCURATE finishing of blind-end cylinder bores, one of the most difficult operations in which to obtain precision in internal cylinder grinding, was developed in 1926 by the Hutto Engineering Co., Inc., Detroit, Mich., to meet the widespread demand of aircraft engine manufacturers.

Oddly enough, this blind-end honing problem has come to the fore in the manufacture of automobile engines, with the result that one of the largest manufacturers of V-type eight cylinder engines has just installed on a battery of machines, special Hutto automatic grinding heads for the finishing of their cylinder bores which present a distinct blind-end finishing problem because of the crankshaft bearing bosses which protrude underneath the cylinder bores.

Engineers of the Hutto Engineering Company, who successfully solved the problems presented in blind-end cylinder grinding more than seven years ago, have perfected this difficult finishing operation by a unique application of their patented "floating cone" mechanism, which utilizes the fulcrum and lever principle to allow the center of pressure of the stones to be shifted to any desired point.

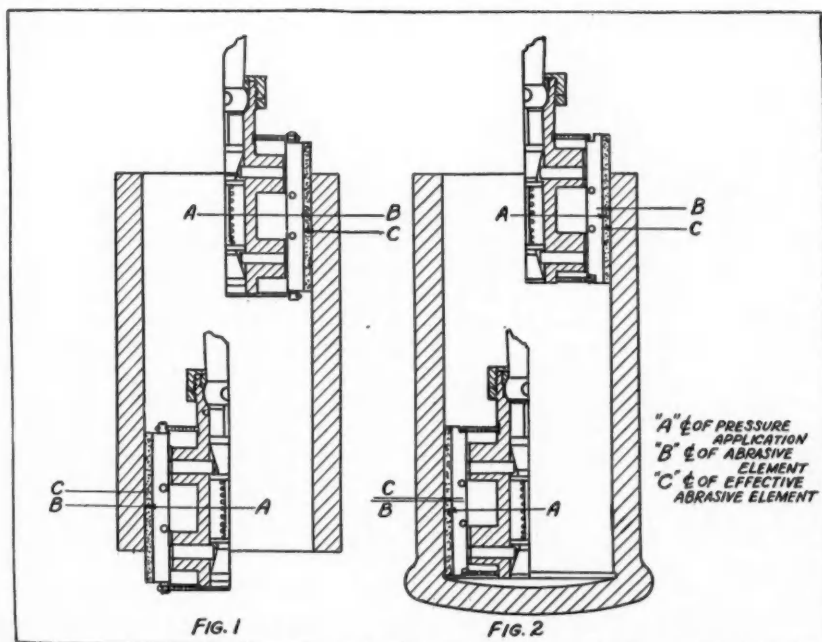
Thus by a simple movement of the fulcrum a greater pressure may be applied to one end of the abrasive sticks than is presented to the other end.

Figs. 1 and 2 illustrate how the increased pressure is obtained. Fig. 1, showing a bore with open ends, illustrates the uniform distribution of pressure over the entire working face of the abrasive sticks. The positioning of the center of pressure on the longitudinal center of the abrasive holder assures the imparting of consistent abrasive effort to all portions of the cylinder bore.

In Fig. 2 the center of pressure is shifted toward the blind end, where the increased pressure is required. This shifting of the center line of the abrasive element toward the blind end of the bore effects a greater pressure on the abrasive member to compensate for the loss of time in abrasive effort due to the inability to overrun the abrasive because of clearance. In the case of open-end bores the shifting of centers is not necessary, as the open ends permit a greater length of overrun or time of the abrasive effort as shown by the grinder in its upper position in Fig. 2.

The use of this principle eliminates the necessity for any increase in the expanding speeds of the opposing ends of the stones,

*Vice-President and General Manager, Hutto Engineering Co., Inc.



Showing how the center of pressure is shifted at the blind end of cylinder

since the additional pressure is gained through a positive fulcrum movement. Blind-end cylinder honing done in this manner definitely prevents the stones from becoming tapered, since the expansion differential remains fixed. This results in greater stone economy and likewise assures a greater degree of accuracy at the extreme blind end of the cylinder.

The floating cone principle allows the mechanism to compensate automatically for all restrictions existing within the bore and also prevents the grinding stones from becoming inaccurate, due to any lack of uniformity in their abrasive content.

Precision in cylinder honing has become an increasingly important factor, since an infinitesimal amount of taper or out-of-roundness in cylinder construction greatly increases the tendency of piston rings to "flutter," with a consequent increase in oil consumption, ring breakage and excessive cylinder wear. The use of the floating cone principle is regarded as a most significant contribution to the science of cylinder grinding, since it automatically insures a high degree of accuracy in work to be held to extremely close tolerances.

Excessive stone cost, due to breakage caused by loosened adhesive, likewise has been successfully eliminated by the Hutto method of die-casting stones in holders made of solid bar stock steel, hardened and ground to precision limits. Stones set in cast metal in holders of this type are not affected by changes in temperature, since the abrasive is sufficiently strong to prevent them from cracking and breaking. Moreover, the use of permanent stoneholders achieves a greater economy of operation, since they may be easily and quickly refilled and require the purchase of only the unmounted stones. Another economy advantage in using cast metal to hold the stones in the steel holders is that the stones, because of their being a vitrified product are easily broken, and after being in use may become cracked and the longer the use the more cracked they become. It is, therefore, necessary to have something that will retain them in the holders until worn out. The cast metal binder will hold the abrasive stick until entirely worn out.

Hutto grinders provide for a high degree of contraction for their removal from cylinders.

Those used for small diameters can be contracted as much as 1/16 in., thus preventing the scratching of the finished job through hasty or careless removal, completely eliminating the need for auxiliary guides.

One large user, who recently installed Hutto machines and grinders, reports that out of 84 aircraft engine cylinders which had been rejected as worthless, 95 per cent were salvaged by use of Hutto equipment. It may be pointed out that each cylinder was valued at approximately \$100. Some of these cylinders were tapered and out-of-round as much as 0.0035 in. and were straightened and made round

within 0.0005 in. with a total stock removal of only 0.004 in.

In conclusion, it may be said that accurate cylinder honing is largely dependent upon the precision with which the complete honing equipment is built. The surface finish achieved at any stage of the operation results directly from the texture of the abrasive used, but the finish is of secondary importance when compared with the accuracy with which the honing equipment performs. A highly polished finish in an inaccurately honed cylinder adds nothing to its efficiency and reduces its life. The perfect combination is exact precision and a good smooth finish.

Methods of Gum Determination

WHEN a cracked gasoline is evaporated to dryness, the weight of residue per unit volume of gasoline depends upon the volume which is evaporated and upon the temperature at which the evaporation takes place. Since evaporation in the engine manifold occurs over a wide range of operating conditions, and since the amount of gum formed is dependent upon the conditions during evaporation, no significant laboratory method for the determination of gum content can be established without quantitative knowledge of the effects of variations in the evaporation procedure.

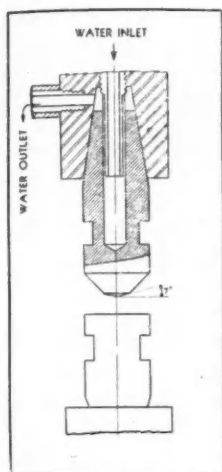
A general evaporation procedure has been developed at the Bureau of Standards in which emphasis is placed on drying the gum residue to constant weight. Variations in time of evaporation were effected by accelerating the rate of removal of the gasoline vapors by means of an air jet through which air passed at various rates of flow. It was found that the weight of gum obtained decreased rapidly with increase in air flow up to a certain rate. Beyond this point a further increase in air flow appeared to have a negligible effect. The investigation of the effect of volume evaporated indicated that the gum content per unit volume decreased as the volume evaporated was decreased. The relative gum content of any two gasolines was, however, found to be independent of the particular volume evaporated. The effect of concentration of the

gum-forming constituents was investigated by making measurements of several gasolines diluted with various percentages of a gum-free gasoline. The gum content per unit volume of undiluted gasoline evaporated decreased with increase in the dilution, but the relative gum contents were found to be independent of the extent of dilution. A study of the effect of temperature of evaporation on the weight of gum obtained indicated that the gum content decreased with increase in temperature. However, the relative gum contents were independent of the particular temperature of evaporation employed.

Gum Content Independent of Temperature of Evaporation

In conclusion, it has been found that when evaporation is assisted by sufficient air flow, the relative gum contents of a series of gasolines are independent of the volume evaporated or of the temperature of evaporation. Accordingly, an air-jet method can be chosen in which any convenient volume of gasoline can be evaporated at any convenient bath temperature, and the same relative gum contents for a series of gasolines will be obtained as at any other chosen bath temperature and volume evaporated. Results by this method as regards gum deposition in the engine should have the same significance as results at any other temperature and volume evaporated.

Aluminum Welding Technique



A recommended design of electrodes for spot welding. One of them is cone-shaped and the other flat. Where three or more thicknesses of material are welded together, it may, in some cases, be advantageous to make both of them cone-shaped.

A summary of the best methods of producing satisfactory torch, arc, spot and butt welds

IN answer to many requests for information concerning the technique of welding aluminum and its alloys, the Aluminum Company of America has just completed an exhaustive survey of practice both in production and maintenance work which has been published in detail in a manual entitled "The Welding of Aluminum."

The following procedure for production welding has been abstracted briefly from this manual. Further instructions can be made available upon request.

TORCH WELDING: Among the methods which are employed for joining aluminum or its alloys, there is none more generally satisfactory than fusion welding with an oxy-hydrogen or oxy-acetylene torch. In the hands of an experienced aluminum welder the process is simple and rapid. It can be applied to metal of all thicknesses. The resultant joint is neat, and, if necessary, the weld can be finished off in such a way that it is impossible to detect where the joint exists.

The same types of joints; butt, lap, tee, fillet, etc., made in any other metal, are also made in aluminum.

Some training will be necessary before a welder can turn out consistently reliable results with aluminum. The metal has distinct characteristics of its own, which involve a somewhat different technique from that required with

steel, cast iron, and other metals. This technique, however, is by no means difficult to acquire, for in point of fact, aluminum is one of the most readily weldable of all metals.

As a natural characteristic, all aluminum is coated with a thin film of aluminum oxide. The production of a sound weld in aluminum necessitates the removal of this oxide film from the welding zone by mechanical means or by solution as with flux.

Aluminum sheet $\frac{3}{8}$ in. or more in thickness and the larger aluminum castings should be pre-heated to 700 deg. F. or 800 deg. F. to avoid heat strains and to reduce the amount of oxygen and acetylene required for the actual melting of the seam. If the base metal, for some distance on either side of the seam, is maintained at a temperature slightly below its melting point, then, when the torch is applied, the additional expansion at any one point will be small and unlikely to cause distortion.

It is important that the pre-heating temperature does not exceed the upper limit of 800 deg. F. If the temperature goes much above this there is danger of some of the ingredients of the alloy melting, producing "burned" material.

As soon as the weld is completed and the work has had time to cool, it should be thoroughly washed to remove all traces of flux. Prac-

tically all successful aluminum fluxes are corrosive to the metal, otherwise they would not be serviceable. It is, therefore, of prime importance that the flux be thoroughly removed within a few hours after welding, especially if the completed job is to be painted or finished. Merely cleaning by means of hot water and a brush is not thorough enough to remove flux from the smaller crevices. A very successful scheme for removing the flux is to wash the welds first in hot water, and then in a hot 5 per cent solution of nitric acid or 10 per cent solution of sulphuric acid. The acid solution should afterwards be washed off with clean, hot water.

ELECTRIC ARC WELDING: The electric arc welding process is divided into two classes: metallic arc and carbon arc. Both methods are being used for welding aluminum.

The metallic arc welding process is particularly applicable to certain classes of work. There is less buckling and warping of the work with arc welding than with torch welding. Pre-heating before welding can be largely eliminated. The temper of the sheet is less affected during arc welding than during torch welding, as in the former case the heat is much more concentrated and the weld is made much more quickly.

In resistance welding the welding heat is, of necessity, localized and obtained by the electrical resistance of the material to be welded and the flow of a heavy current. Spot, seam, and butt welding are the types of resistance welding used for aluminum alloys. The technique used with aluminum resistance welding is, however, greatly different than that used with steel.

SPOT WELDING REQUIREMENTS: For a number of years automatic spot welding machines, such as are employed with steel, have been used without change with some success for the spot welding of the common aluminum alloys. When used however with the heat-treatable alloys the results were extremely variable. Even the welds in the common alloys were often unsatisfactory because the inherent characteristics of aluminum demand that the period of power application be extremely short. Hence the equipment required precision synchronous electrical control which most automatic spot welders lacked.

The inertia of the moving electrode should also be kept as low as possible, a feature of considerable

importance when welding light gage material to avoid undesirable hammer-blow.

Furthermore, spot welds in aluminum alloys must be made with the metal in a molten state, yet the outside surfaces of the sheets, contacting the electrodes, must be practically cold. Thus a heavy welding current is necessary to make the weld quickly.

Because of these requirements, automatic spot welding machines designed for use on steel do not produce satisfactory results when used on aluminum and its alloys, unless certain special recommendations are followed.

BUTT WELDING: The butt welding of aluminum alloys, particularly when simple sections are involved, closely approaches resistance

butt welding of steel.

The thermal gradient extending from the weld to the clamping electrodes is not as steep as with spot or seam welding. For this reason, precision, synchronous control is not necessary except for extremely small sections. The equipment is therefore of a relatively simple nature.

An ordinary butt or flash welding machine, if of sufficient electrical capacity, will perform excellently with aluminum alloys with but few changes. Push-up is taken care of on a pressure basis rather than on a rate of travel. The time of power duration is governed by any contact device which will open the power contactor when the electrodes have traveled together a preset distance.

BOOK REVIEWS

Standards of Petroleum Products

A.S.T.M. Standards on Petroleum Products and Lubricants, published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia.

THIS publication brings together in convenient form the many A. S. T. M. standard and tentative methods pertaining to petroleum and the 1933 report of Committee D-2 on Petroleum Products and Lubricants. In all there are 51 test methods given. Many of these have been approved by the American Standards Association and the American Petroleum Institute.

Revisions in several of the standard methods were adopted in 1933 by the Society. These are given in their latest form and cover the fol-

lowing tests: cloud and pour points; viscosity, flash and fire points with open cup, and sulfur in petroleum oils heavier than illuminating oils. Tentative standards included, which were revised this year, cover the

Arc Welding Design and Practice

Procedure Handbook of Arc Welding Design and Practice, published by the Lincoln Electric Company, Cleveland, Ohio.

ELECTRIC welding has been in a state of rapid development for some years past, and while quite a number of books have been published on the subject, most of these are more or less out of date, hence

tests for penetration of greases and petrolatum and tests for bituminous emulsions.

The 1933 report of Committee D-2 summarizes the changes recommended in the various test methods developed by the committee and includes an appended technical paper "A Procedure for Measuring Bleeding of Cup Greases."

The Book of Stainless Steels

NO less than 77 authorities on making and using the many kinds of heat and corrosion resisting chromium alloys collaborated to write "The Book of Stainless Steel," under the editorship of Ernest E. Thum.

The text resolves itself into a logical and consecutive compendium of practical information with the emphasis on the uses of the various types of stainless. About two-thirds of the chapters describe the prop-

erties of the steels—how to fabricate them and what to expect of them. Others tell of a multitude of successful applications described by men in the consuming industries.

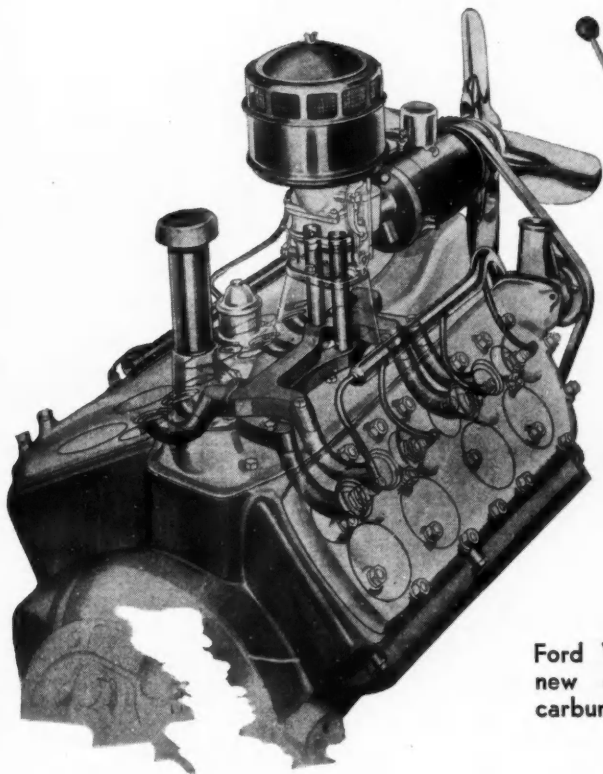
"The Book of Stainless Steels" has 614 pages of text and 200 illustrations, including photographs, charts, and diagrams. Price is \$5 post paid. Orders may be sent direct to the American Society for Steel Treating, Cleveland, Ohio.

the appearance of a new volume containing up-to-date information on both design and procedure for arc welding is a matter for satisfaction. The book is intended not only for welders and heads of welding departments, but also for those responsible for the design of products which may be built by welding. Data are included on procedure, speeds and welding costs. The book is well illustrated with photographs and drawings.

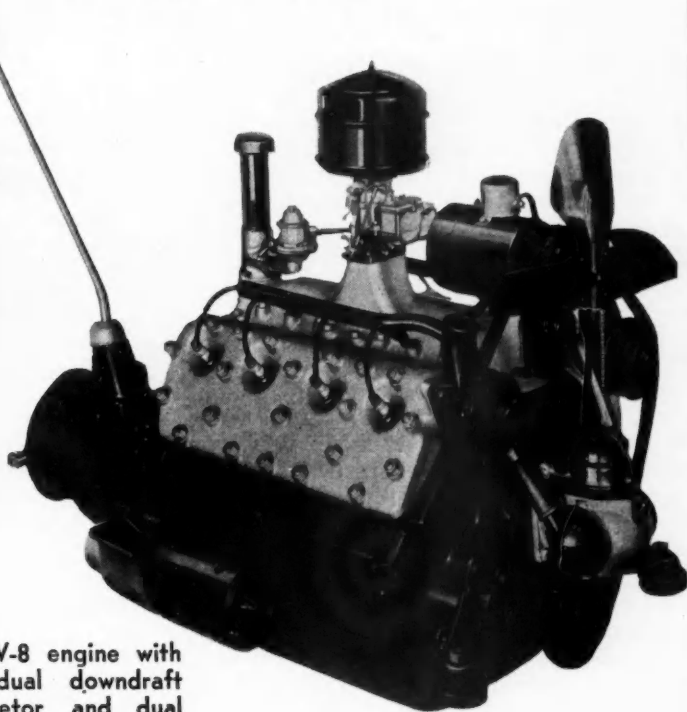
The volume is divided into eight sections bearing the following heads: Welding Methods and Equipment, Technique of Welding, Welding Procedure, Speeds and Costs, Structures and Properties of Weld Metal; Weldability of Metals; Designing for Arc-Welded Steel Construction of Machinery; Design for Arc-Welded Fabrication of Steel Structures; Typical Applications of Arc Welding in Manufacturing Construction and Maintenance.

Mechanical Features of the 1934 Ford Eight

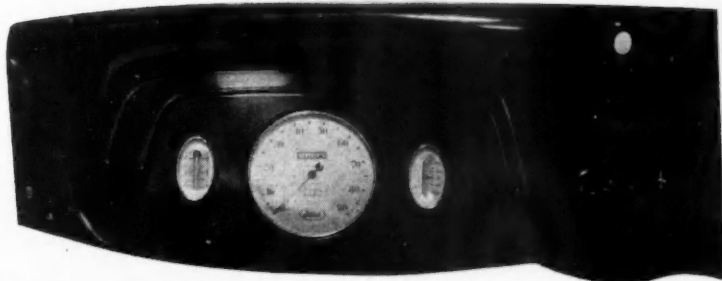
The description of the new Ford models begins on page 691



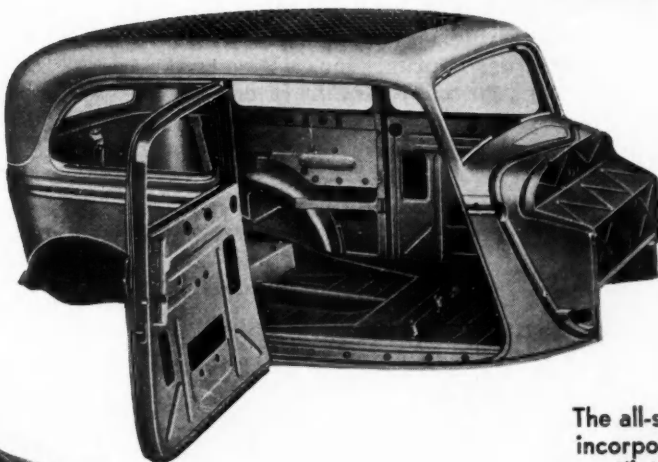
Ford V-8 engine with new dual downdraft carburetor and dual manifold



Each branch of the dual manifold supplies inner cylinders of one and outer cylinders of the other bank



Some changes have been made in the instrument panel



The all-steel body which incorporates new ventilating features



Plates of the transverse rear spring are now "pointed" to prevent squeaking

Mechanical Handling Cuts Accident Hazard

IN an address before the National Safety Council Convention in Chicago, October 3, C. B. Auel, of Westinghouse Electric & Mfg. Co., outlined the role of safety devices in the modern safety program of industry. Some of the high spots of his paper are given below.

With reference to mechanical guards, in the design of tools and equipment and in the development of processes, endeavor should be made to avoid the necessity of the operators having to use guards at all or to take precautions against accident, thus making whatever it may be absolutely fool-proof, for there can then be no possibility of accident in the event of human failure.

When purchasing machine tools or equipment, it is well to include in the specifications a clause to the effect that other things being equal, preference will be given to the best guarded designs; or better yet, in-

clude exact specifications for guarding and thus avoid misunderstandings.

In a plea for the greater use of mechanical handling devices as a means of assuring safety, Mr. Auel

| | Number | Per Cent |
|---------------------------------------|---------|----------|
| Handling Objects | 58,249 | 25.9 |
| Falls to a different level | 19,616 | 18.2 |
| Falls to the same level | 21,426 | |
| Machinery | 26,884 | 11.7 |
| Vehicles | 24,569 | 10.9 |
| Falling Objects | 19,572 | 8.7 |
| Using Hand Tools | 17,050 | 7.5 |
| Stepping on or striking objects | 12,552 | 5.5 |
| Electricity, explosions, heat | 8,021 | 3.5 |
| Harmful substances | 4,607 | 2.5 |
| Other | 12,115 | 5.3 |
| Total | 224,661 | 99.7 |

gives some statistics in Table 1 which indicate clearly that the item of handling objects is by far the greatest single cause of industrial accidents.

This would seem to indicate, therefore, that mechanical handling should be substituted as much as possible for handling by hand, and among the most important safety devices for this work should, therefore, be listed mechanical feeding, conveyors, trucks, cranes, hoists and the like. Sometimes a rerouting of material through the manufacturing departments or a change in the sequence of operations may reduce the amount of handling; occasionally it is gloves or wearing apparel that cause the accident, and even the not wearing of them may be the cause.

Curtis-Bill Front Drive Bus Built on Lines of Street Car

The first of a new type of small bus, produced by the Bill Motors Company of Oakland, Cal., has just been delivered to the North Sacramento Bus Co., of North Sacramento, Cal. It is of the street-car type and seats 20 passengers. The bus is built around the Curtis-Bill front-drive unit which permits

greater headroom for a given overall height. Standard chassis units are used throughout, including a Lycoming eight-cylinder engine, a Warner transmission, a Ross steering gear and hydraulic brakes with a Searle booster. The wheelbase of the Curtis-Bill bus is 144 in. and the tread 71½ in.



The new Curtis-Bill front-wheel drive twenty-passenger bus

Foreign Notes

Several distinguished visitors from Europe have contributed to the comment on railcar trends in this column. Royal Senator Giovanni Agnelli, pres. of Fiat, who was present for the official trial of the T & P train built by Budd, said that railcars are being widely used in Italy on feeder lines. It works like a conveyor line with steam trains on a backbone main line and railcars feeding traffic at points along the line. None of this equipment rolls on rubber.

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Tests Gas In Car on Road

An exhaust-gas tester for internal combustion engines, indicating the proportion of air to fuel in the mixture supplied to the engine, has been placed on the market by the Cambridge Instrument Co., Inc., Ossining, N. Y. The mixture ratio is indicated directly on the scale of the instrument, which ranges from 10 to 15. It is therefore possible, by means of this

"standard" gas is moisture-saturated air which is contained in a sealed chamber in which the "comparison" spirals are located. The spirals are heated a definite amount by a current from two standard dry cells contained within the instrument case, and they will remain in balance as long as they are surrounded by similar gases and thus are at like temperatures. However, when the "test" spirals are exposed to the exhaust gas the bridge will become unbalanced, resulting in a

galvanometer, the complete movement being supported and floating in the field of the magnet. This magnetic cushion absorbs any shocks received, protects pivots against wear, and results in a rugged instrument that withstands hard usage, according to the manufacturers. It has the further advantage that it makes it possible to use the instrument in a car when being driven over rough roads, the reading of the instrument being steady even under such conditions.

The price of the instrument is \$215.00.

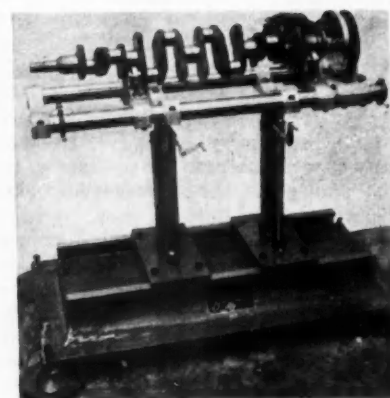
Fast Check of Balance

For economical production of parts requiring dynamic balance, the Tinius Olsen Testing Machine Co., Philadelphia, has brought out a checking machine to be used for quick inspection of balanced parts. It is said to be fast and accurate and particularly useful where the work is done on a piece-work basis.

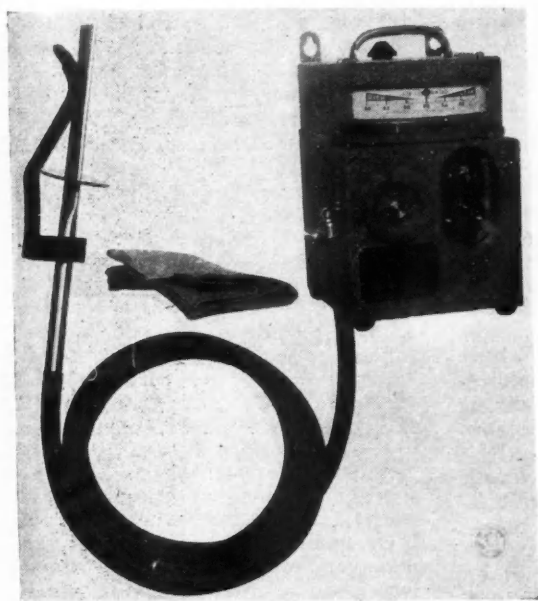
While Olsen dynamic balancing machines give accurate readings as to the amount and angular position at which correction should be made, the actual correction by drilling, or by adding weights, may not be exactly right either in amount or angular position, especially if the part is irregular in shape or in some cases where it is not possible to make correction in the exact location indicated by the balancing machine.

The principal function of the Olsen Checking Machine, therefore, is to indicate whether or not the part is balanced within the limits of accuracy, as set by the Engineering and Inspection Department. This machine is simple in construction, fast and easy to operate. It can check about three times as many shafts per hour as can be indicated in the balancing machine. The amounts of unbalance on the checking machine are shown by two large dials, one at either end of the machine, which indicate the amount of dynamic unbalance which may exist.

The machine shown is suitable for checking parts up to 36 inches in length between end bearings, having a maximum diameter of 12 inches



Tinius Olsen dynamic
balancing machine



Cambridge exhaust-gas
tester

instrument, to determine rapidly the "richness" or "leanness" of the mixture, which information is essential in adjusting the carburetor.

The instrument, of which a photograph is reproduced herewith, is furnished in an aluminum case with cover and weighs 29 lb. It has a crackle finish, the standard color being red, and the hardware is chromium-plated. Ten feet of rubber hose is supplied for conducting a sample of the gas from the exhaust pipe of the engine to the instrument, together with a stainless steel fitting for insertion into the exhaust pipe.

The instrument operates on the well-known thermal-conductivity principle. Four platinum spirals form the four arms of a Wheatstone bridge circuit, two being exposed to the gas under test and two to a gas of known heat-conductive capacity. The known or

deflection of the galvanometer pointer to an extent depending on the variation in the constituents of the gas, and in this manner it is possible to read the air-fuel ratio directly.

The four spirals are contained in an equal number of cells within a heavy copper block, the object of the latter being to equalize the temperatures of the air or gas surrounding the spirals. After entering the instrument the gas is filtered through a cartridge containing metal wool, and it then enters the chamber, from which it diffuses into the test cell. It is then exhausted at the side of the instrument. A drain valve is provided on the under side, to discharge any condensate that may accumulate, as well as excess gas when the engine is running at very high speeds.

There is a novel feature in connection with the moving system of the

"Help the President" Ford Says as He Launches Greatest Merchandising Drive

Selling Program Outlined for New Line in International Telephone Conference Foreshadows Tremendous Effort to Regain Sales Leadership—Will Lend Dealers Working Capital

DETROIT—"We all have got to pitch in to do all the business we can in 1934 to help the President pull the country out of the hole. I think 1934 will be a very good year for everybody who works."

With these words, Henry Ford on Thursday of this week launched the greatest merchandising drive in the company's 30-year history. He spoke over the most comprehensive telephone hook-up ever set up to dealers and salesmen assembled in 41 branch cities in the United States and Canada for what was described as the "first international telephone sales conference."

Those who heard the program which followed Mr. Ford's brief talk, had no doubts left in their minds that the next 12 months would witness a drive of tremendous proportions to restore the Ford car to a position of sales leadership. Throughout the conference, there were repeated evidences of a sincere desire to establish a more personalized relation between dealers and the factory and of the recognition of the mutuality of their interests. In fact, the subject matter and spirit of the conference program indicated clearly that there was a new deal in Ford methods.

W. C. Cowling, sales manager, was master of ceremonies at the conference. He introduced Henry Ford, who was followed by his son, Edsel. Then came Wallace Campbell, president of Ford of Canada, and L. S. Sheldrick and R. H. McCarroll of the Ford technical staff.

Featured in all advertising will be the slogan, "The Car Without a Price Class," with copy stressing Ford features said to be found only in higher price class cars. Widespread use will be made of newspaper and magazine advertising. The company will go on the air with half-hour programs twice a week featuring Fred Waring and his Pennsylvanians. In addition, the company has had a film entitled "These Thirty Years," produced in which the history of the Ford company is dramatized. This film, which was shown at the conference, takes an hour and a half to show and the plan is to campaign it all over the country, admission being free. In the larger cities, it is planned to run it a week or more. Promotion plans detailing the steps to be taken by dealers in putting on the film have been prepared.

National advertising will be handled through N. W. Ayer & Son, while Ayer and McCann-Erickson between them will handle all advertising out

of the branches. Dealers will contribute \$6 per car to the advertising program.

The company is also launching a comprehensive course of retail sales training employing about 25 slide-films with sound to put the instruction over. Entrance into the Producer's Club has been made easier for new salesmen, this club consisting of retail salesmen who sell a quota of four cars monthly. Salesmen who qualify receive a bonus from the factory of \$5 per car.

It was also announced at the conference that Universal Credit had formed the Universal Dealers Co., which will lend working capital to dealers who have shown their ability to produce.

National Labor Board Holds Budd Hearing

WASHINGTON—The National Labor Board held a hearing on Budd labor troubles on Dec. 7, the case having been referred to it by the Philadelphia Regional Labor Board.

The suggestion of the Regional Labor Board that a new election be held to determine who the employees wanted to represent them, was rejected by the Budd company in a letter signed by E. G. Budd, president. In this letter Mr. Budd pointed out that the company's employees had previously by an affirmative ballot of 92 per cent of their number selected their representatives in a manner that was understood to have the approval of the Regional Labor Board. Mr. Budd also stated that there has been no suggestion that there was interference, restraint or coercion.

Buick First With "Knees"

FLINT—The Buick Motor Company has swung into full production of the 1934 models and its cars will be the first G.M. cars to be introduced. The new cars will be made available to the public about the middle of December, Harlow H. Curtice, president and general manager, announced this week.

Seiler Appoints Green to G.M.T. Executive Staff

DETROIT—Paul W. Seiler, president and general manager, General Motors Truck, announces the following personnel changes:

G. A. Green, former vice-president

in charge of operations, is appointed a member of executive staff and will now share with Mr. Seiler and I. B. Babcock the responsibility for establishment and maintenance of all policies and procedures affecting various divisions of the General Motors Truck Corp., according to statement.

Other appointments are W. B. Livingston, formerly purchasing agent, assistant to president; H. J. Crichton, formerly assistant purchasing agent, supervisor of purchases; C. O. Ball, former body engineer to chief engineer; W. D. Reese, assistant chief engineer; W. E. Moody, assistant factory manager, and H. J. Havermale, chief inspector.

H. W. Peters Named Cadillac Assistant S. M.

DETROIT—J. C. Chick, general sales manager, Cadillac, announces following appointments:

H. W. Peters, formerly Packard vice-president in charge of sales, who joined the Cadillac organization as special representative in July, has been named assistant general sales manager, succeeding Don E. Ahrens, who goes to New York as general manager of Cadillac branch there. Mr. Ahrens replaces Arthur E. Randall, who has resigned to become a Cadillac distributor. Victor C. P. Drieske has been appointed general manager of Chicago Cadillac branch, succeeding R. G. Tiffany, who also resigned to become a Cadillac distributor. Mr. Drieske was general manager of Cadillac Cleveland branch.

Cole Is Hupp Asst. G. M.

DETROIT—Rufus Cole, vice-president in charge of sales for Hupp, has in addition been elected assistant general manager, Charles D. Hastings, president and general manager, announces. An administrative committee consisting of C. E. Gambill, Chicago distributor, Eric Courtney, Boston distributor, Ralph P. Lyons, Hupp treasurer, and Mr. Hastings also has been named. Mr. Gambill is chairman of this committee.

NEWS

December Production Expected to Exceed 100,000 as Factories Rush New Models

Assembly Plant Strikes Still Regarded as a Hazard—November Car and Truck Sales Estimated at Well Over 100,000—Bad Weather and Pre-Announcement of New Models Cut Sales Volume

by Athel F. Denham

Field Editor, Automotive Industries

11 Months Car Sales Total \$946,000,000

Dollar Volume Up 17%
Against 38% Increase
In Domestic Unit Sales

PHILADELPHIA — Domestic new passenger car registrations in November had a list price valuation of \$69,000,000 against \$88,000,000 in the preceding month and \$34,000,000 in the corresponding month last year, according to preliminary estimate made by *Automotive Industries*. The estimates show an increase of more than 100 per cent over last year and a seasonal decline of 22 per cent from October.

New car registrations in the United States in November are estimated at 108,000 by Polk on the basis of reports from 107 principal cities. This is the largest total for the month since 1929, sales in November, 1930, 1931 and 1932 having been respectively 93,066, 75,829 and 44,358. Sales in October, 1933, were 136,326.

For the first 11 months, domestic registrations were valued at close to the billion mark, the estimated total for the period being \$946,000,000 against \$808,000,000 in the same period in 1932, an increase of 17 per cent. Registrations in the first 11 months approximated 1,448,000 as compared with 1,051,000 last year, a gain of 38 per cent.

Wayne County November Sales Double Last Year

DETROIT—Wayne County new car registrations during November totaled 1,766, a decrease of approximately 40 per cent from the October figure of 2,895. Compared with November 1932 registrations there was an increase of 107 per cent. Ford totaled 501, Plymouth 381, Chevrolet 262 and Dodge 208.

Commercial registrations totalled 212 compared with 260 in October and 109 in November last year. Ford was the leader with 88, Dodge a close second with 79 and Chevrolet registered 16.

DETROIT—Factory sales reports covering dealers normally representing two-thirds of all passenger car sales indicate total domestic retail deliveries for November aggregating roughly 80,000 units, considerably below earlier estimates. Truck deliveries will bring the total to well above the 100,000 mark.

Passenger car deliveries represent an increase of roughly 30 per cent over last November. Contributing to the decline in sales the latter part of the month were bad weather conditions in certain sections and preannouncement advertising on forthcoming new models.

Automotive Industries compilation of factory production figures indicates total November production for the industry, including Canada, as approximately 61,000—almost exactly equal to totals for November last year. November should mark the low point for the year and, unless strikes close assembly plants during December, a production total in excess of 100,000 units should be attained. Last December production totaled close to 110,000, but new model production got under way much earlier, the low point being reached in October instead of November.

As it is the majority of automobile companies will be going to the New York Show with hand-built models.



F. C. Crawford, formerly first vice-president of Thompson Products, Inc., who has been elected president of the corporation, succeeding the late C. E. Thompson

Reo November shipments totaled four times shipments for November last year with unfilled orders on hand indicating continued active operations through December.

Pontiac reports dealer stocks as of Dec. 1 lowest in ten years.

Dodge passenger car and truck retail deliveries, contrary to the normal trend, are holding up well. Week ending Dec. 2 deliveries totaled 1,690 passenger and 910 trucks both higher than preceding week and 200 and 500 per cent over corresponding period last week. Total November deliveries were 7,020 cars and 3,879 trucks.

Hupmobile November shipments totaled 445 units, close to the October totals and well ahead of November last year.

Factory sales of Studebaker automobiles in November are estimated at about 8000 cars compared with 6250 in October and 1084 in November, 1932.

NACC Members Build 47,052 in November

November production of members of the National Automobile Chamber of Commerce was placed at 47,052 cars and trucks in a preliminary estimate released by the Chamber this week.

This output, which does not include Ford, represented an increase of 46 per cent over the production for the same group of manufacturers for November of last year and a decrease of 53 per cent under their output for October of this year.

Eleven months' production was estimated at 1,451,363 units, an increase of 63 per cent over last year.

The report of N.A.C.C. member production is summarized in the following table:

| | |
|-----------------------|-----------|
| November, 1933 | 47,052 |
| October, 1933 | 101,082 |
| November, 1932 | 32,289 |
| 11 Months, 1933 | 1,451,363 |
| 11 Months, 1932 | 893,095 |

Clark Equipment Dividend

CHICAGO—The Clark Equipment Company has declared a dividend of 25 cents a share on the common stock, marking the first payment on the issue since Dec. 15, 1931, when 25 cents was paid.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

There was a moderate decline in general business activity last week, which, for the most part, is attributed to the uncertainty attending the Administration's monetary policy. Wholesale buying also fell off during the week. Industrial operations made a relatively good showing. There was a slight gain in steel output, and a further increase is anticipated during this month.

Car Loadings Drop Again

Railway freight loadings during the week ended Nov. 25 totaled 581,347 cars, which marks a decrease of 17,942 cars below those during the preceding week, an increase of 88,029 cars above those a year ago, and an increase of 22,549 cars above those two years ago.

Retail Food Prices Firm

The decline in the general average of retail food prices during the four weeks preceding was checked during the two weeks' period ended Nov. 7. The index of the Bureau of Labor Statistics showed an advance of 0.2 per cent during that fortnight.

Small Decline in Power Production

Production of electricity by the electric light and power industry in the United States during the week ended Nov. 25 declined 0.6 per cent.

Foreign Trade Increases

Exports during October amounted to \$194,000,000, as

against \$160,108,000 during the preceding month and \$153,090,000 a year ago. Imports totaled \$151,000,000, as against \$146,652,000 and \$105,499,000 respectively.

Oil Production Low

Average daily crude oil production for the week ended Nov. 25 amounted to 2,253,750 bbl., which is 84,750 bbl. below the allowable figure set by the Secretary of the Interior. This level compares with 2,307,100 bbl. for the preceding week and 2,099,250 bbl. a year ago.

AAA Crop Reduction

On Nov. 24 the Agricultural Adjustment Administration announced that payments up to that time made to wheat farmers in accordance with the crop-reduction agreement amounted to \$1,086,048.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended Dec. 2 stood at 71.4, as against 71.7 the week before and 72.1 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended Nov. 29 showed increases of \$4,000,000 in holdings of bills bought in the open market and of \$7,000,000 in holdings of discounted bills. Holdings of government securities remained practically unchanged.

announcement by James D. Mooney, president of that association and also of the General Motors Export Company. In his new capacity, Mr. Tipper will undertake the active promotion of the association's policy that foreign trades is essential to our domestic recovery. Mr. Tipper is well known in the automotive field, having been vice-president and sales manager of General Motors Export and also business manager of *Automotive Industries*.

Extra Lock to Save 10% on Insurance in Chicago

NACC and Underwriters Cooperate to Decrease Windy City Theft Rate

NEW YORK—In an effort to reduce the high rate of automobile stealing in the Chicago area, directors of the National Automobile Underwriters Association, following a conference with the Insurance Committee of the National Automobile Chamber of Commerce, approved a plan providing for a 10 per cent discount on insurance rates for passenger cars equipped with auxiliary locking devices, approved by Underwriters' Laboratories.

This plan, which is being undertaken on an experimental basis for one year, became effective Dec. 1.

How serious the situation has become is reflected by records which show that during the first six months of this year 17,409 automobiles were reported stolen in Chicago, while for the same period, registrations of new passenger cars amounted to 29,164.

While factory installed locks are adequate and all that would be used or required by the average car owner, the insurance people believe that in the Chicago situation motorists are inclined to take extra precautions of this kind as their only protection.

The insurance people on the other hand believe this should be encouraged through a 10 per cent discount in theft rates when additional locks are installed.

To date, the Underwriters' Laboratories have approved two auxiliary locking devices, the Decker Automobile Lock and the Titan Combination Automobile Lock.

Pontiac Field Force to View 1934 Cars Dec. 11

DETROIT—All Pontiac regional and zone managers, and their staffs, have been called to the factory for a two-day convention beginning Dec. 11, at which they will get their first view of the 1934 Pontiac straight eight. Immediately after the session here, similar meetings will be conducted in the following regional office cities: Detroit, Dec. 13; New York, Dec. 14; Chicago, Dec. 18, and Memphis, Dec. 20. These meetings will be conducted

by Sales Manager A. W. L. Gilpin, assisted by Assistant Sales Managers R. K. White and C. P. Simpson, Parts and Service Manager A. H. Bartsch, Business Management Manager A. C. S. Olson, Office Manager W. I. Gibson and Sales Promotion Manager W. R. Huber.

Exporters Name Tipper

NEW YORK — Harry Tipper has been appointed executive vice-president of the American Manufacturers Export Association, according to an

1934 Chevrolet Soon

DETROIT—Early introduction of the 1934 Chevrolet line is anticipated following the announcement that public showings would be held as soon as sufficient cars were available to stock the company's dealers with display models. Production is reported to be expanding rapidly and is nearly normal at the Detroit forge plant and the carburetor and die-casting plant in Bay City. Other manufacturing plants in Detroit, Flint and Toledo are stepping up production rapidly.

Automotive Exports Continue to Expand

October Improvement Due Largely to Truck Demand

WASHINGTON—Exports of automotive products from the United States during October were valued at \$8,901,846, compared with \$8,610,004 in September and \$5,355,793 in October, 1932, according to P. R. Mattix, Automotive-Aeronautics Division, Department of Commerce.

October was the fourth successive month in which the sales abroad of automotive products were larger in value than the preceding month, and, with the exception of March, 1932, when exports were valued at \$9,999,388, exceeded in value the exports for any month since October, 1931.

The improved trade during the month was due almost entirely to increased foreign sales of trucks, which numbered 5,541, valued at \$2,762,636 in October, compared with 4,604, valued at \$2,059,493 in September, and 2,537, valued at \$1,182,850 in October, 1932.

Passenger cars numbering 5,802, valued at \$2,957,404, were shipped abroad from the United States during the month, compared with 6,234, valued at \$3,024,175, in September, and 1,675, valued at \$973,491, in October, 1932.

Exports of miscellaneous automotive products increased during the month and totaled \$3,181,806, com-

pared with \$3,526,336 in September, and \$3,199,452 in October, 1932.

Japan, British India, Spain, Australia, and the Philippine Islands were the chief markets of importance for trucks during the month of October, each showing substantial increased purchases as compared with the preceding month.

The Union of South Africa and Belgium maintained their positions as leading export markets for American passenger cars during the month. Japan replaced Denmark as the third most important foreign outlet for American passenger cars, while Netherlands, Argentina, Canada and Venezuela ranked next in order.

Richard W. Meade

MT. KISCO, N. Y.—Richard W. Meade, one-time president of the New York Transportation Co. and the Fifth Avenue Coach Co., and organizer of the Detroit Motorbus Co. and the St. Louis People's Motorbus Co., died here Dec. 3. Mr. Meade is credited with having placed the first automobile cabs equipped with taximeters on the streets of New York.

Harry J. DeBear

CYNWYD, PA.—Harry J. DeBear, well known in automotive circles in New York and Philadelphia, died at his home here on Nov. 30. Mr. DeBear was for many years manager of the Maxwell-Chalmers agency in New York and later became Chrysler distributor in Philadelphia.

Efforts to Reorganize Willys-Overland Cease

Bondholders Asked to File Proof of Claims

NEW YORK—All negotiations for a reorganization of Willys-Overland have ceased, according to Charles G. Cushing, chairman of the bondholders' protective committee. While Mr. Cushing said that the committee would welcome further efforts in that direction, he made it clear that he does not think reorganization likely.

He also revealed that unexpected legal difficulties have arisen affecting the bondholders' lien. Under the Ohio laws, the validity of the mortgage provision making property acquired after its execution security for the bonds, has been questioned. Other creditors are opposing the bondholders' claim of a prior lien on such after-acquired property. Inasmuch as such property is said to represent a substantial percentage of the value of the company's equipment, the question is an important one.

Meanwhile receivers have requested bondholders prove claims by Dec. 15.

Gasoline Consumption Up

NEW YORK—Gasoline consumption in September totaled 1,446,832,000 gallons, according to the American Petroleum Industry, a gain of 2.91 per cent over last year. In the first nine months, consumption was 1.06 per cent under the same period in 1932.

Exports and Imports for the Automotive Industry for October and Ten Months Ended October, 1933-1932

| | October 1933 | | October 1932 | | Ten Months Ended October | | | |
|---|--------------|-------------|--------------|-------------|--------------------------|--------------|-------------|--------------|
| | Number | Value | Number | Value | Number 1933 | Value 1933 | Number 1932 | Value 1932 |
| Automobiles, parts and accessories..... | ..... | \$3,592,915 | ..... | \$6,194,993 | ..... | \$73,982,149 | ..... | \$66,809,391 |
| Motor trucks, buses and chassis (total)..... | 5,567 | 2,767,761 | 2,533 | 1,182,890 | 33,880 | 15,337,246 | 21,263 | 9,749,088 |
| Under one ton..... | 550 | 162,396 | 142 | 44,818 | 3,806 | 1,096,146 | 2,034 | 549,623 |
| One and up to 1½ tons..... | 4,028 | 1,606,592 | 2,152 | 860,772 | 25,498 | 9,632,664 | 16,930 | 6,718,316 |
| Over 1½ tons to 2½ tons..... | 747 | 658,438 | 134 | 103,094 | 3,436 | 2,817,160 | 1,658 | 1,367,694 |
| Over 2½ tons..... | 213 | 331,862 | 109 | 174,206 | 917 | 1,675,746 | 641 | 1,113,465 |
| PASSENGER CARS | | | | | | | | |
| Passenger cars and chassis..... | 5,906 | 2,993,177 | 1,675 | 973,489 | 57,928 | 28,256,668 | 36,244 | 21,006,238 |
| Low price range \$850 inclusive..... | 5,516 | 2,558,530 | 1,475 | 732,826 | 53,875 | 23,680,641 | 31,442 | 15,079,579 |
| Medium price range over \$850 to \$1,200..... | 162 | 157,752 | 142 | 133,957 | 2,228 | 2,153,034 | 3,083 | 2,930,067 |
| \$1,200 to \$2,000..... | 83 | 137,690 | 37 | 49,666 | 960 | 1,453,716 | 1,156 | 1,525,829 |
| Over \$2,000..... | 41 | 103,432 | 21 | 57,042 | 294 | 739,518 | 563 | 1,470,763 |
| PARTS, etc. | | | | | | | | |
| Parts except engines and tires..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Automobile unit assemblies..... | ..... | 832,531 | ..... | 1,412,065 | ..... | 14,921,401 | ..... | 18,591,521 |
| Automobile parts for replacement (n.e.s.).. | ..... | 1,494,913 | ..... | 1,035,908 | ..... | 10,235,270 | ..... | 11,060,597 |
| Automobile accessories (n.e.s.)..... | ..... | 163,647 | ..... | 87,246 | ..... | 1,178,717 | ..... | 1,228,261 |
| Automobile service appliances..... | ..... | 89,303 | ..... | 83,789 | ..... | 791,085 | ..... | 1,399,568 |
| Airplanes, seaplanes and other aircraft..... | 18 | 128,166 | 42 | 686,570 | 343 | 4,708,693 | 197 | 2,617,169 |
| Parts of airplanes, except engines and tires | .. | 361,579 | ..... | 188,282 | ..... | 1,971,703 | ..... | 1,072,936 |
| INTERNAL COMBUSTION ENGINES | | | | | | | | |
| Stationary and Portable: | | | | | | | | |
| Diesel and semi-Diesel..... | 4 | 38,£50 | 13 | 9,089 | 28 | 103,275 | 44 | 141,741 |
| Other stationary and portable: | | | | | | | | |
| Not over 10 hp..... | 296 | 16,483 | 358 | 27,687 | 2,600 | 165,761 | 3,507 | 224,455 |
| Over 10 hp..... | 43 | 27,423 | 54 | 16,713 | 662 | 275,537 | 615 | 306,434 |
| Automobile engines for: | | | | | | | | |
| Motor trucks and buses..... | 39 | 10,602 | 33 | 12,379 | 1,676 | 218,727 | 1,598 | 262,265 |
| Passenger cars..... | 899 | 46,309 | 383 | 23,099 | 18,561 | 1,122,923 | 18,606 | 1,413,719 |
| Aircraft..... | 216 | 186,525 | 219 | 109,306 | 2,292 | 1,118,835 | 1,329 | 929,711 |
| Accessories and parts (carburetors)..... | .. | 78,101 | ..... | 102,138 | ..... | 792,330 | ..... | 1,038,255 |
| IMPORTS | | | | | | | | |
| Automobile and chassis (dutiable)..... | 71 | 41,099 | 76 | 16,689 | 430 | 240,543 | 426 | 208,880 |
| Other vehicles and parts for them (dutiable) | .. | 12,991 | .... | 12,884 | .... | 100,176 | .... | 52,841 |

Axle-Shaft, Water Heater and Leaf Spring Supplement to APEM Code Are First to Have NRA Public Hearings

Sales below Lowest Representative Cost Established by Uniform Accounting Are Outlawed—Trade Practice Rules Provide Comprehensive Regulation of Merchandising

WASHINGTON—Public hearings were held here this week on fair trade supplements to the A.P.E.M. code for the replacement axle-shaft manufacturing, the automobile hot water heater manufacturing and leaf spring manufacturing product groups. These are the first supplements to come up for consideration and for that reason much interest attaches to them.

Each of the supplements provide for the comprehensive regulation of the merchandising practices of the groups and makes it unfair competition to sell below established "representative cost." Administration will be through administrative committees appointed respectively by the Automotive Replacement Axle Shaft Institute, Detroit; the Automobile Hot Water Heater Institute, Cleveland, and the Leaf Spring Institute, Detroit.

The axle shaft supplement covers only the replacement field, while the other two cover both original equipment and after-market fields.

The ban on sales below established cost is the same in all three supplements and reads as follows:

"The Administrative Committee shall proceed to establish uniform methods and principles of cost accounting in conformity with accepted standards for use by the members of the Product Group. . . . Upon approval by the Administrator (NRA), such methods and principles shall be used by each member of the Product Group in determining his costs. Each member of the Product Group shall report his individual costs, computed in accordance with said methods and principles, to a disinterested and impartial agency designated by the Administrative Committee, and such agency, in cooperation with the Administrative Committee and subject to the approval of the (APEM) Code Authority, shall determine the representative member of the Product Group whose costs are lowest. Such 'lowest representative cost' shall be published to the Product Group and no member shall sell his products below such 'lowest representative costs.' The Administrative Committee shall revise such 'lowest representative costs' from time to time at reasonable intervals."

All three supplements outlaw commercial bribery, imitation of trade marks, inaccurate advertising, guarantee of prices against advance or decline, consignments, lifting competitor's stocks, making the purchase or lease of any goods a condition of the purchase or lease of other goods, etc.

Filing of price schedules and terms of payment also is required, and selling below scheduled prices or granting more favorable terms are made unfair competition in all three supplements, provision being made for filing new schedules. None of the supplements provides resale price maintenance. The axle shaft supplement specifies distributors, wholesalers or jobbers, mail order houses, chain stores, consumer or list prices,

fleet owners sold direct, and car wreckers as the classifications for which schedules are to be filed. The other two supplements provide for the establishment of customer classifications, without defining them. All customers in a classification must be sold at the same price.

The axle shaft supplement limits credit terms to 2 per cent, 10th prox., with no cash discount on trade acceptance or note settlements. Accounts 30 days past due are to carry 6 per cent interest. On initial orders maximum terms of three months may be granted. This supplement also rules out special brands except on existing contracts, which must be registered with the Administrative Committee.

The leaf spring supplement sets terms of net 30 days or net 15th prox. on original equipment sales, and a maximum of 1 per cent 10th prox. on primary outlet sales.

The heater supplement contains a standard warranty against defective material and workmanship and allowing credit for defective material outside the scope of this warranty is made unfair competition. The leaf spring supplement contains a similar warranty provision.

Volume rebates are barred by the axle makers, but both the heater and leaf spring supplements provide for "a credit rebate to customers based on the customer's individual total annual net purchases of \$5,000 and multiples thereof, at such rates" as may be approved by the Administrative Committee, the Code Authority and NRA.

Warehouse stocks are required by all three supplements to be totally owned by the member and he must do his own collection and billing work. Other regulations of warehousing also are provided.

Members of the axle-shaft supplement are forbidden to participate in clinics or shows not sanctioned by the Administrative Committee.

In the leaf spring supplement, members are divided into three groups: Class A consisting of original equipment manufacturers, Class B of replacement manufacturers, and Class C of manufacturers who maintain spring service stations which produce part or all of the springs and parts sold by them for replacement.

Stambaugh With Hudson

DETROIT—T. H. Stambaugh, until recently in charge of service and parts sales development in the Central Sales Section of the General Motors

Corp., has joined the organization of the Hudson Motor Car Company. Mr. Stambaugh will be in charge of sales development on service and parts sales under the sales department.

D. C. Fenner Elected Vice-President of Mack

NEW YORK—David Colton Fenner, who for 14 years has been manager, public works department, Mack-International Motor Truck Corp., has been elected a vice-president of that corporation. He is chairman of the



D. C. Fenner

Motor Vehicle Conference Committee, member of the Legislative Committee of the National Automobile Chamber of Commerce, director of the New York Motor Truck Association, vice-president and director of the Automobile Merchants Association of New York, and has been prominent in public relations and legislative work for the automotive industry for many years.

Bender Is Lycoming G. M.

WILLIAMSPORT, PA. — W. H. Beal, president of the Lycoming Manufacturing Company, a division of the Cord Corporation, has announced the appointment of Frank H. Bender as vice-president and general manager of Lycoming. John E. Dunbar, former purchasing agent of the company, becomes assistant general manager.

Landis an Auburn Director

AUBURN—Arthur Landis, a vice-president of the Auburn Automobile Company, has been elected a director and in addition appointed vice-president in charge of operations in the Connersville and Auburn, Ind., plants of the company, it was announced here by W. H. Beal, president of Auburn. Mr. Landis has been with the Auburn organization for many years.

Railroads Would "Sock" Big Trucks and Buses

WASHINGTON—Nine per cent of the motor vehicles would pay 55 per cent of the nation's highway budget according to a taxation formula developed by the Bureau of Railway Economics. In relation to highway costs, the formula states that the cost of highways adequate for 5-ton trucks and buses of more than 33-passenger capacity would be more than twice as great (210.4 per cent) as the cost of a highway ample for the base group of vehicles which includes all cars and trucks up to 1½-ton capacity. The 5-ton truck and the bus with more than 33 seats should contribute 107 times as much as the base group.

The summary of the survey on which the formula was based does not indicate why the railroads should be spending their money developing highway taxation formulas nor does it suggest that highway users interest themselves in creating taxation formulas for railroads.

G.M. Dealer Stocks Take Big Drop in November

NEW YORK—Stocks of General Motors cars and trucks in the hands of the corporation's U. S. dealers declined more than 31,000 units in November. Sales to domestic consumers during the month approximated 35,000 units, against 63,518 in October and 12,780 in November, 1932. Sales to domestic dealers numbered 3400 in November, as compared with 47,982 in the preceding month and with 2405 in the same month last year. World sales to dealers totaled about 10,000

as contrasted with 5781 in November, 1932, and 53,054 in October.

In the first 11 months, domestic sales to consumers amounted to 743,000, against sales to U. S. dealers of 724,000, indicating that at the end of November U. S. dealer stocks were about 19,000 lower than on Jan. 1, 1933. In the first 11 months of last year retail sales were 490,000, while sales to U. S. dealers amounted only to 429,000. In same period world sales to dealers were 847,000 this year as contrasted with 509,000 in 1932.

Ask OK on 5000 More Willys Overland 77's

TOLEDO—Authority to make 5000 Willys 77's was sought from Federal Court today as attorneys for many interests in the receivership met.

Judge George P. Hahn put over his decision on both truck and passenger car applications until agreement is reached by the attorneys. Thirteen attorneys are meeting here to go over many problems (see page 713) connected with the receivership to try to work out a solution. A decision is not expected before Friday and possibly not until Monday.

Receiver Miller says passenger cars are being made at \$20 to \$30 loss but that the program is warranted by keeping a going organization, plant in operating condition, and maintaining employment for 2500 workmen.

TOLEDO—Authority to make 1,500 more model D-1 half-ton trucks for International Harvester was filed today by receivers for Willys-Overland. This would keep plant on present schedules through January and February.

Steel Turns Upward as Motor Buying Starts

Decline in Automotive Inventories Bringing Buyers into the Market

NEW YORK—A turn for the better is noted this week in steel buying by automotive consumers.

A gain in steel mill operations of 6 per cent over the preceding week reported by the American Iron and Steel Institute was largely made possible by the broader call for steel from parts makers and motor truck manufacturers. This is all the more encouraging to the steel industry, as in normal years the first week in December is usually one of the year's duller in the steel market.

More business is under negotiation, some consumers striving to hold commitments as much as possible in abeyance until after the completion of inventories. A good many motor car manufacturers and body builders have been carrying relatively heavy reserves of sheets. In most cases these stocks have been worked down to a point where new buying will be in order in the course of the next few weeks.

Parts makers are asking strip mills to accommodate them with rush shipments of part of their fresh purchase. Quite a little steel will be rolled in December for shipment in January.

The \$2 per ton advance in the price of manufacturing wire, which becomes effective on the last day of the year, has brought to wire mills an influx of specifications from contract customers desirous of availing themselves of the lower price, and some of the wire mills are operating at close to double their November rate. The \$3 to \$4 per ton advance in cold-finished steel bars, which becomes effective Jan. 1, is also bringing out a greater tonnage of business than that product has enjoyed in several months.

Alloy steel specialists are beginning to benefit from better interest on the part of automotive buyers. Orders, as a rule, do not run very heavy in tonnage, but demand emanates from a steadily growing number of smaller and medium-size consumers.

Pig Iron—Automotive foundries are preparing for heavier melts by taking in more iron. There is talk of the possibility of further upward price revision in the near future. Under present conditions, buyers run virtually no risk of declining prices and so the tendency is to stock up as much as possible. Quotations are unaltered.

Aluminum—Unchanged.

Copper—It was reported in the market this week that, once agreement is reached on the proposed copper code, a minimum sales price of 9c. will be established for electrolytic. Pending adoption of a code, the market continues to mark time, with electrolytic quoted at 8c., delivered Connecticut Valley.

Tin—Spot Straits tin was quoted at 53c. at the opening of the market this week. Fluctuations in Sterling exchange make the market highly irregular and even speculative activity is restrained by the uncertainty.

Passenger Car Production by Wholesale Price Classes

(U. S. and Canada)

Ten Months 1933 and 1932 Compared

| | 1933 | 1932 | Per Cent Change | Per Cent of Total 1933 | Per Cent of Total 1932 |
|-----------------------|-----------|-----------|-----------------|------------------------|------------------------|
| Under \$500 | 1,278,233 | 684,728 | +86.7 | 82.1 | 65.3 |
| \$501-\$750 | 217,358 | 241,599 | -10.1 | 13.9 | 23.0 |
| \$751-\$1000 | 28,481 | 70,937 | -59.8 | 1.8 | 6.8 |
| \$1001-\$1500 | 15,790 | 34,046 | -53.6 | 1.0 | 3.2 |
| \$1501-\$2000 | 9,384 | 7,668 | +22.3 | 0.6 | 0.7 |
| \$2000-\$3000 | 7,622 | 7,976 | -4.5 | 0.5 | 0.8 |
| \$3000 and over | 1,687 | 2,344 | -28.0 | 0.1 | 0.2 |
| Totals | 1,558,555 | 1,049,298 | +48.5 | 100.0 | 100.0 |

Truck Production by Capacities

(U. S. and Canada)

| | 1933 | 1932 | Per Cent Change | Per Cent of Total 1933 | Per Cent of Total 1932 |
|------------------------------------|---------|---------|-----------------|------------------------|------------------------|
| 1½ tons and under | 290,219 | 194,696 | +49.1 | 92.7 | 92.3 |
| 2 to 3 tons | 18,918 | 11,468 | +65.0 | 6.1 | 5.4 |
| 3½ tons and over | 2,864 | 3,818 | -25.0 | 0.9 | 1.8 |
| Ambulances, fire, buses, etc. | 1,057 | 961 | +10.0 | 0.3 | 0.5 |
| Total | 313,058 | 210,943 | +48.3 | 100.0 | 100.0 |

Automotive Industries

December 9, 1933

Ford Gets CCC Order for 818 Trucks as McCarl Rules Against Johnson

WASHINGTON — The Northwest Motor Co., local Ford dealer, has been awarded a contract for 818 trucks for the Civilian Conservation Corps, thereby ending one of the bitterest controversies in which the NRA has been engaged. The announcement of the acceptance of the Ford bid was made by Secretary of Agriculture Wallace on the basis of the ruling of Controller General McCarl that there was no legal ground for barring Ford.

As a result the Northwest Motor Co. gets an order totaling \$427,635.72 for 172 half-ton trucks with pick-up bodies, 117 1½-ton stake trucks and 529 1½-ton dump trucks. Chevrolet received an order for 53 1½-ton dump trucks valued at \$29,877.16.

Mr. Wallace's announcement gave many the idea that a conciliatory policy was being inaugurated in an effort to enlist Mr. Ford's cooperation. The Secretary said, "On the advice of the Controller General as to the best way to secure compliance with the President's recovery program, and on the concurrence of the Secretary of Agriculture, it has been decided to accept the bid of the Northwest Motor Co., dealers in Ford automobiles, for the Civilian Conservation Corps.

All along the CCC has been anxious to get the trucks and wanted the stop signal turned so they could go ahead. As a result it was decided to have the Quartermaster General of the Army open bids on the trucks. This was done in the face of bitter opposition by Mr. Sabine of the Northwest Motor Co., who charged "trickery" and carried his battle to the Controller General, the Secretaries of War and Agriculture and the President. The Army opened bids for six-cylinder trucks, that number of cylinders being required by the Army as a minimum since last spring according to the War Department. The Ford bid had to be for eight-cylinder trucks as a consequence and Chevrolet was low. The award as finally made, however, was on the original basis and calls for four-cylinder trucks in the case of the Ford equipment."

The awards are regarded in some quarters here as setting a precedent for other Ford business from the government amounting possibly to \$1,500,000.

General Johnson attempted to bar the award to Ford originally on the ground that Ford had not affirmatively assented to the automobile code and because he said Edsel Ford has told him that the Ford company would not bargain collectively, at the same time admitting that Ford was complying with the code so far as he knew. These contentions were re-

jected by the Controller General. Subsequently the General argued that the Northwest Ford bid was contrary to the motor vehicle retailing code which forbids dealers to sell new vehicles below the established delivered price. On this point, the Controller General said that such matters were up to the courts and not to any administrative function as to whether they violated the law.

In any case the General's contention was applicable only to the 172 half-ton trucks included in the award as only trucks with a rated capacity of ¾ ton or more are subject to the price maintenance rules of the dealer code.

Alexander Legge

CHICAGO — Alexander Legge, president of the International Harvester Co., died in his suburban home at Hinsdale on Dec. 3. In addition to his position as one of the nation's



Alexander Legge

leading industries, he was widely known for his services to the government culminating in his chairmanship of the Federal Farm Board created in the Hoover Administration. During the World War, he was vice-chairman of the War Industries Board and had charge of the Allied Purchasing Commission. Mr. Legge was born in Wisconsin in 1866. He joined I. H. C. in 1891, rising steadily until he became its president.

Jarman Joins Ray Day

DETROIT—A. Ross Jarman has joined Ray Day Piston Corporation of Detroit as service engineer, according to a recent announcement by J. C. Roper, Jr., Sales Manager. He will specialize on the piston engineer-

ing problems of bus and truck operators. Mr. Jarman was formerly connected in an engineering capacity with the Champion Spark Plug Co. and Defiance Spark Plugs, Inc.

Dealers Urged to Solve Used Car Problem First

Vesper Says Major Objectives Should Get Trade's Undivided Attention for the Time Being

ST. LOUIS—Dealers were urged to concentrate on the major objectives of their code, in a message issued this week by F. W. A. Vesper, chairman of the National Control Committee. He listed these objectives as compliance with the wage and hour sections, enforcement of the used car rules and maintenance of new car delivered prices.

"Without question," he continued, "the dominant project of the operation of our code revolves around the benefits to be obtained through the provisions of the used car section. This is the 'keystone' of our entire code. Most of our problems center around it. We strongly urge every dealer to concentrate upon the solution of this phase of our program above everything else. Do not permit less important problems at this time to sidetrack you from the big objective."

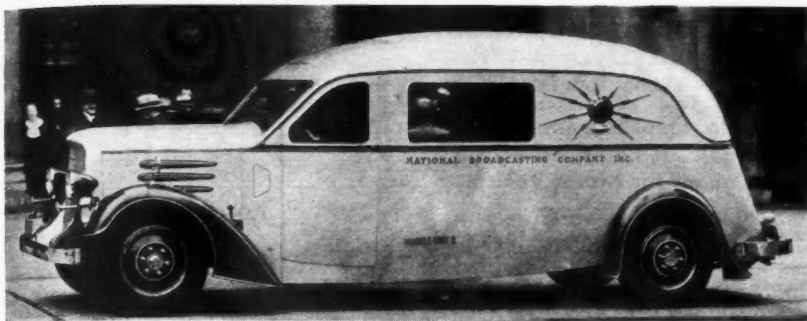
"As dealers, you will progress more rapidly and soundly if you devote your entire attention to this single problem. It may be necessary to continue for a time to put up with some of the many other problems, in order to gain the desired results."

Studebaker Current Position Is Better

SOUTH BEND—The Sept. 30 receivers' consolidated balance sheet of the Studebaker Corp. shows a further improvement in the company's current position. Net working capital was \$6,310,145 against \$5,610,693 on June 30. During the third quarter current assets increased from \$8,640,041 to \$8,964,396, while current liabilities decreased from \$3,029,348 to \$2,674,250. Cash increased from \$2,406,789 to \$3,463,621.

Goodyear Denies All Federal Trade Charges

WASHINGTON—Goodyear denied all charges lodged against it by the Federal Trade Commission in its formal answer filed here this week. The company admitted that it had a contract with Sears, Roebuck to make tires on a cost plus basis but denied any discrimination in violation of the Clayton Act. The next step presumably will be a hearing of the charges.



Mobile broadcasting unit built by General Motors Truck

GMT Builds Mobile Broadcasting Units

Effective Range Is 100 Miles and Have Speed of 65 M.P.H. Up 5% Grade

DETROIT—General Motors Truck has built a number of mobile broadcasting stations for the National Broadcasting Co., which will use them in special-event broadcasting. The transmitter employed has a range of 100 miles when the truck is stationary and of 50 miles when it is moving. The power used is 150 watts and the frequency range is 35 to 10,000 cycles. Five different receivers, covering the entire wave band, are included in the equipment, as are generators, batteries and chargers providing both alternating and direct current supply.

In the construction of the vehicle, every precaution was taken to prevent noise and electrical interference. Moreover, to enable the truck to keep up with escorts, it is capable of 65 m.p.h. up a 5-per cent grade. The announcer's seat is beside the driver's, and his accommodations include a drop table for typing and writing, and an overhead trapdoor, which, when opened, automatically brings a wind visor into place to protect the announcer and the "mike."

Motorcycle Code Hearing Set for December 12

WASHINGTON—Hearing on the code of fair competition submitted to the NRA by the Motorcycle Manufacturers' Association, claiming to represent 100 per cent of the industry, will be held Dec. 12 in Room 3032, Commerce Building, before Deputy Administrator Walter A. Janssen.

N.A.D.A. Schedules N. Y. and Chicago Conventions

ST. LOUIS—The annual meeting of the National Automobile Dealers Association will be held in the LaSalle

Hotel, Chicago, January 29 and 30, 1934. The annual banquet will be held on the evening of the latter day. The annual eastern meeting will be held in the Hotel Commodore, New York, on January 8.

Automobile manufacturers have set aside these days so that there will be no factory meetings conflicting with the N.A.D.A. events, a condition which in the past has been regarded as detracting seriously from the attendance at the dealer association gatherings.

No Dumping Duty On U. S. Goods

OTTAWA—Canada will not levy a dumping duty on American goods because of the depreciation of the dollar so long as the discount is not more than 5 per cent.

Frontenac and Rugby to Be Discontinued

Only Reo Section of Dominion Motors Plant to Continue Operation

TORONTO—The Frontenac and Rugby Divisions of Dominion Motors Limited, Toronto, will be closed down at the end of December, the only portion of the plant to remain in operation being that which is responsible for the manufacture of Reo cars and trucks for Canadian distribution.

Associated with this news is the announcement that Roy D. Kerby, president and general manager of Dominion Motors Limited, will retire early in 1934 to become identified in an executive capacity with another large manufacturing company in Canada.

Inability to obtain parts and materials from United States sources, particularly metal body stampings, is given as the reason for the discontinuance of the manufacture of Frontenac cars and Rugby trucks. This difficulty was heightened recently when Dominion Motors Limited launched its plans for the production of 1934 models of the Frontenac line. The cost of making dies and setting up the machinery for such stampings is estimated at \$750,000 and mills in the United States were reluctant to undertake this work without assurance of a greater volume of business than was offered by the Toronto company, it is said.

Repairshop Code Provides 48-Hour Average Maximum Weeks and Bars Sales Below Cost

WASHINGTON—Public hearing on the Code of the automotive maintenance garage trade was held here on Dec. 8.

The tentative draft of the Code provides for maximum hours of 48 per week and 8 per day, averaged over a four-week period. In emergencies 54 hrs. weekly and 10 hrs. daily may be worked, but the four-week average must not exceed 48 hrs. These hour regulations, which do not apply to employees earning more than \$30 weekly and to those in executive jobs, contrast with a flat 44-hr. weekly maximum permitted automobile dealer service stations under the motor vehicle retailing code.

Permissible minimum wages range from \$14 to \$15 on a population basis, with a minimum of 50 cents for mechanical workers. Minimums of 40 cents per hour are permitted under certain conditions.

Administration will be through a Code Authority of 13 members with provision for three non-voting members to be appointed by NRA. The

Code Authority members are to be selected on a regional basis, the Code grouping the States into regions for the purpose. Each regional member will be selected by the State Advisory Committees of the States within the region. State Advisory Committees will be elected directly by the members of the Code. Provision also is made for local administrative committees.

The Code Authority is charged with the duty of setting up a uniform accounting system which members must adopt after it has been approved by NRA. Each member must report his costs to an impartial agency designated by the Code Authority and that agency will determine which representative member of the trade has the lowest costs. This member's costs will be published and no member will be permitted to sell below the costs so established. Each member is required to make his schedule of charges available to the public, and cutting these prices is to be considered unfair competition.

Business Operations of Private and Contract Motor Carriers Not Subject to U. S. Control, NACC Contends

Chamber Filed Brief in Reply to Questionnaire Issued by Federal Coordinator of Transportation Eastman—Urge Uniform Size and Weight Regulations for Motor Vehicles

NEW YORK—There is no legal authority for federal control of the business operations of private and contract motor carriers as to rates and service and such a program would defeat the primary purpose of the commerce clause of the Constitution which is to protect and promote free flow of interstate commerce, declares the National Automobile Chamber of Commerce in a brief filed December 4 with Joseph B. Eastman, Federal Coordinator of Transportation.

The brief, which is in reply to a questionnaire issued November 4, eliciting data on federal transportation legislation, recommends on the other hand relaxation of rail regulation to meet changed competitive conditions.

The Chamber agrees with issuance of certificates and proof of financial responsibility and liability of interstate common carriers for the protection of the public, but is opposed to undertaking rate control. It is felt that data from certificates should provide the necessary information to show what further steps are advisable.

The American Association of State Highway Officials uniform standards for vehicle sizes are recommended as a further means of improving conditions in interstate commerce over the highways.

Court decisions are cited by counsel for the Chamber to prove that no legal authority exists under which the Federal Government could enact legislation to regulate contract and private motor operators.

In answering a question to the effect put by the Coordinator, the automobile group declares:

"Federal power to regulate rates or restrict operations of contract or private carriers in interstate commerce cannot rest upon a proprietary interest in the highways and the consequent right to preserve and conserve them, which have been the grounds for court decisions sustaining State regulations of this character. Lacking such proprietary interest, the Federal Government can act only under its power to regulate interstate commerce, a power which the courts have said cannot be construed to enlarge the authority of Government to deal with a subject and which in any event is subject to the limitations of the fifth amendment.

"Congress can prohibit the movement in interstate commerce of objects deleterious to the health or morals of the people, or the transportation of persons or articles basically harmless, for immoral or criminal purposes. It can require the removal of obstructions to the free flow of interstate commerce and impose such regulations as are reasonably related to this purpose.

"It can regulate the rates and operations of common carriers by rail or by truck as such businesses are admittedly devoted to a public use and affected by the public interest. It can prevent discrimination against interstate commerce in the rates and charges of intrastate common carriers by rail or truck. It can subject contract carriers and private carriers engaged in interstate commerce to regulations de-

signed to protect the public safety, health or morals.

"The Federal Government cannot restrict the operations of private or contract carriers nor fix the charges of contract carriers merely because they engage in interstate commerce. To permit regulation in these particulars their operations must tend to promote monopolies of, restraints upon, or obstructions to, interstate commerce, or must involve the obligation to perform service for the public. Such private operations are not conducted under any grant of privileges which impose the duty of rendering service to the public as are common carriers and other public utilities. Historically they have not been regarded as clothed with a public interest nor do they bear any peculiar relationship to the public that subjects them to regulation. Even the states do not have authority to regulate contract carriers for the sole purpose of protecting the business of common carriers by controlling competitive conditions.

"The primary purpose of the commerce clause was to protect and promote the free flow of interstate commerce. Operations of private and contract carriers by motor truck have a tendency to prevent monopoly rather than encourage it and to enlarge competition and promote the free flow of interstate commerce in line with the constitutional purpose. Any declaration by Congress that these private operations constitute such obstructions or restraints upon interstate commerce as to be 'affected with a public interest' would be so at variance with the facts as to be subject to condemnation by the courts as being arbitrary and capricious and in violation of the fifth amendment."



Allen S. Heaton (Left). Assistant Director of Merchandising and Oscar E. Mittelstaedt, Assistant Director of Advertising for the Dodge Brothers Corp.

Alexander Urquhart

LANSING—Alexander Urquhart, 69 years old, veteran auto body builder, died here Dec. 2. He became manager of the Auto Body Company at its organization in 1901 and during his administration became one of the largest establishments of its kind in the world. He later was connected with the old Lansing Body Company but had retired in recent years from business activity.

CALENDAR OF COMING EVENTS

AUTOMOBILE SHOWS

| | |
|-----------------------|----------------|
| New York | Jan. 6-13 |
| Toronto, Ont. | Jan. 13-20 |
| Milwaukee, Wis. | Jan. 13-20 |
| Newark, N. J. | Jan. 13-20 |
| Cleveland, Ohio | Jan. 13-20 |
| Buffalo, N. Y. | Jan. 13-20 |
| St. Louis, Mo. | Jan. 14-20 |
| Cincinnati, Ohio | Jan. 14-20 |
| Philadelphia, Pa. | Jan. 15-20 |
| Brooklyn, N. Y. | Jan. 15-20 |
| Detroit, Mich. | Jan. 20-27 |
| Hartford, Conn. | Jan. 20-27 |
| Baltimore, Md. | Jan. 20-27 |
| Boston, Mass. | Jan. 20-27 |
| San Francisco, Calif. | Jan. 20-27 |
| Montreal | Jan. 20-27 |
| Pittsburgh, Pa. | Jan. 20-27 |
| Montreal, Canada | Jan. 20-27 |
| Rochester, N. Y. | Jan. 22-27 |
| Chicago | Jan. 27-Feb. 3 |
| Washington, D. C. | Jan. 27-Feb. 3 |
| Camden, N. J. | Feb. 3-10 |
| Los Angeles | Feb. 3-11 |
| Omaha, Neb. | Feb. 5-9 |
| Rapid City, S. D. | Feb. 7-10 |
| Springfield, Ill. | Feb. 8-10 |
| Kansas City, Mo. | Feb. 10-17 |
| Syracuse, N. Y. | Feb. 10-17 |
| Black Hills, S. D. | Feb. 15-17 |
| Des Moines, Ia. | Feb. 19-24 |
| Evansville, Ind. | Feb. 20-24 |
| Denver, Colo. | Feb. 20-28 |

OTHER SHOWS

| | |
|--------------------|------------|
| Road Show, Chicago | Jan. 22-27 |
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CONVENTION AND SHOW

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| Natl. Assoc. of Engine and Boat Mfrs., New York City | Jan. 19-27 |
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CONVENTIONS

| | |
|--|------------|
| American Road Builders' Association, Chicago | Jan. 22-27 |
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MEETINGS

| | |
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| Natl. Automobile Dealers Assoc. Meeting, New York City | Jan. 8 |
| Rubber Assoc. Meeting and Banquet, New York | Jan. 8 |
| S.A.E. Annual Dinner, New York | Jan. 8 |
| Motorcycle & Allied Trades Assoc. Annual Meeting, New York | Jan. 10 |
| S.A.E. Annual Meeting, Detroit | Jan. 22-25 |
| National Automobile Dealers Assoc., Chicago | Jan. 29 |

NEW YORK SHOW WEEK EVENTS

| | |
|--|---------|
| International Registration, N.A.C.C. Offices | Jan. 6 |
| International Luncheon, N.A.C.C. Offices | Jan. 8 |
| National Automobile Dealers Assoc., New York | Jan. 8 |
| N.A.C.C. Export Managers Meeting N.A.C.C. Offices | Jan. 9 |
| N.A.C.C. Annual Banquet, Hotel Commodore, New York | Jan. 9 |
| N.A.C.C. Directors' Meeting N.A.C.C. Offices | Jan. 10 |

"Met" Section Postpones Meeting to Dec. 21

NEW YORK—The December meeting of the metropolitan section of the S.A.E. will be held on Dec. 21 instead of on Dec. 14 as originally scheduled. The principal paper will be presented by Edwin S. Hall under the title "Automobile Control and the Transmission Problem." W. J. Davidson of General Motors also will talk informally on independent wheel suspension and will show motion pictures of cars using this system.

G.M. Exports Boom

NEW YORK—General Motors sales in the Overseas markets for November from all sources totaled 10,280 units, an increase of 90 per cent over the total for November, 1932, an increase of 70 per cent over the total for November, 1931, and an increase of 24 per cent over the total for November, 1930.

Sales for the first 11 months of 1933, despite the low volume in the

early months of the year, were 54 per cent higher than the volume in the corresponding 11 months' period of 1932, and more than 50 per cent higher than the sales reported for the entire year 1932.

J. Walter Thompson to Advertise New Nash Car

CHICAGO—J. Walter Thompson Company has been appointed to handle all advertising in connection with the new "mystery" car with which the Nash Motors Company will invade the low price automobile field, it was announced at Kenosha, December 1. The company stated definitely that the new car will be introduced at the New York Automobile show, January 6.

Auto Laundry Hearing

WASHINGTON—Public hearing will be held here on Dec. 14 on the code of the Automobile Laundry Trade.

Eastman Asks Public for Views on Rail Service

WASHINGTON—A travel-habit questionnaire for the general public is the latest development in the transportation consumer research being conducted by Joseph Eastman, Federal Coordinator of Transportation. The questionnaire itself is vaguely reminiscent of the questionnaire sent out by Henry Weaver in the consumer research activities of General Motors.

It asks for data on automobile mileage and costs, travel by other agencies, rail and Pullman fares, excursions and tours, railroad sales methods, advertising, station service, coach service, dining service, equipment, etc.

Three Manufacturers Join Auto. Electric Association

CLEVELAND—Briggs & Stratton Corp., Norma - Hoffman Bearings Corp. and Zenith-Detroit Corp. have become members of the manufacturing division of the Automotive Electric Association.

The New Ford V-Eight

(Continued from page 693)

window ledges. None of the air enters along the bottom edge of the doors. The small amount admitted in this way and the large surface over which it is spread in entering the body prevent noticeable drafts, but the amount of ventilation is increased by opening one or more windows.

A particular advantage claimed for the system is that it helps materially in preventing the windshield from fogging in damp or rainy weather. The window slots are opened and closed by an additional turn of the same handle by which normal window regulation is effected. For additional ventilation the windshield can be opened at the bottom. The cowl ventilator is now equipped with a draft deflector which directs the entering air toward the dash. A screen is provided in the ventilator to keep out insects.

The victoria model body is entirely new. Its over-all length is greater than that of the preceding model, providing additional leg room, and a large luggage compartment is built into the rear. Access to the compartment is through a large opening similar to a rumble-seat door. The door of the compartment has side shrouds,

and a top boot is furnished, so that when left open there is sufficient space for several suit cases or a small trunk. Considerable space is available also when the door is closed. The body is fitted with individual front seats of new design.

The body colors are to be used on the fenders of all de luxe cars for 1934, and on standard green and gray cars, with black fenders optional. In addition to black, the line of colors includes a maroon, a green, a blue and a gray, with suitable complementary colors for wheels of de luxe cars. Wheels on standard models are black. A new enamel finish, which is said to have unusual wearing qualities and enduring lustre, will be used for both bodies and fenders of all models.

Many refinements have been made in the body interiors. New style, more deeply-cushioned, individual bucket seats are provided for the driver and front passenger in the Tudor sedan. Both seats tilt forward, and the driver's seat is adjustable. Both standard and de luxe cars have new-style garnish moldings. Those on the de luxe cars are finished in a mahogany color with grain effect. On the standard cars a pull-to-grip is incorporated with the molding on the

doors, whereas the de luxe models have a pull-to strap. Arm rests are provided on the doors of all de luxe cars. The rear seat arm rests are also of a new style. The trim on the doors has been improved. While the same upholstery materials are used in the de luxe cars as in former models, both seat cushions and seat backs are tufted. The headlining of all models is now trimmed to give a cove effect. On de luxe models a carpet on the heel-board improves appearance. The body hardware is also of new design.

The instrument panel has been changed to the same color as the instrument board—mahogany with grain effect on de luxe cars and plain on standard cars. On de luxe models the graining of the belt-rail finish panel and ash receptacle has been changed, for improved appearance. Sun vizors on de luxe cars are new in style and so designed that they may be moved to the side as well as lowered in front of the driver and side passenger. Operation of the door handles has been reversed. In the new models it is necessary to raise the handles to open the doors, which gives additional protection against inadvertent opening.

Now that cars HERE'S *the*

FRICTION-FREE. The Fafnir Unitary Ball Bearing Cartridge has a minimum of static friction. It assures free, undamped movement at the hinge points throughout the total movement.

LOAD CAPACITY. The Fafnir Unitary Ball Bearing Cartridge is designed for the rapid, oscillatory motion of all independent wheel suspensions. It has high load capacity under the conditions encountered.

ELIMINATION OF WEAR. Excessive play is avoided. Wear is practically eliminated because friction is absent. As a result the original freedom in the assembly is maintained in the car indefinitely.

THRUST CAPACITY. Thrust in both directions as well as radial load capacity is provided in the Fafnir Unitary Ball Bearing Cartridge. Hence, both the loads imposed by the wheels striking obstructions and the thrust imposed when going around a curve are readily absorbed.

ASSEMBLY SIMPLICITY. Fafnir's Ball Bearing Cartridge is a complete, assembled unit with the outside diameter ground to standard ball bearing tolerances. Installation in any car is simplicity itself—and as economical as it is simple.

RE-LUBRICATION ELIMINATED. These Fafnir Unitary Ball Bearing Cartridges are packed in grease at the Fafnir plant, and the grease is sealed in. No further lubrication is needed.

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